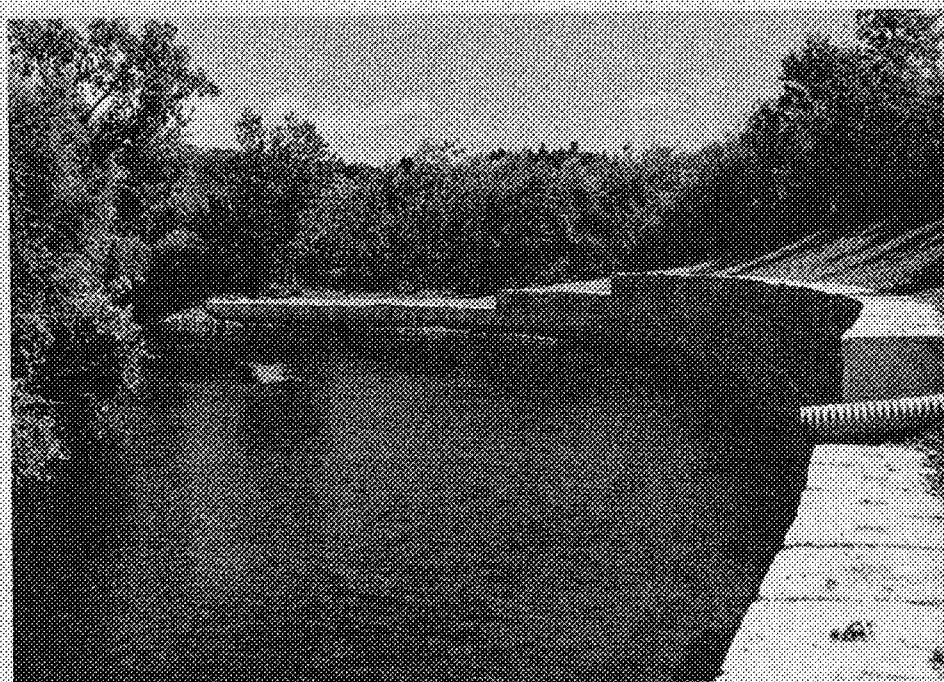
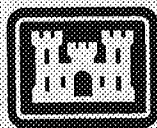

Detailed Project Report
North Nashua River
Leominster Connector
Leominster, Massachusetts

Emergency Streambank Protection



June 1990



**US Army Corps
of Engineers**
New England Division

**DETAILED PROJECT REPORT
NORTH NASHUA RIVER
LEOMINSTER, MASSACHUSETTS**

EMERGENCY STREAMBANK PROTECTION

Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts

JUNE 1990

SYLLABUS

This Detailed Project Report was prepared under the special continuing authority contained in Section 14 of the 1946 Flood Control Act, as amended, to determine the need and feasibility of providing emergency streambank protection along the North Nashua River in the city of Leominster, Massachusetts. Severe erosion of the roadway embankment for the Leominster Connector, an important public highway, has imposed a threat to the public safety. The Corps of Engineers and the Massachusetts Department of Public Works (MDFW), the local sponsor, jointly developed a course of action wherein the MDFW designed and implemented temporary slope repairs while the Corps prepared a permanent solution. The temporary project was constructed by the MDFW during July - August 1989. This temporary work has alleviated the immediate threat to the public safety. The site conditions are being monitored to identify any changes that may occur to the as-built project features that could endanger the public facility in the immediate future.

The investigation contained herein recommends construction of a stone revetment as the most feasible means for providing permanent streambank protection. The revetment as planned could be constructed without removal of most of the existing temporary protection.

Total project costs for permanent embankment repair are estimated to be \$221,000 of which \$165,800 represents the Federal share. The remainder, \$55,200 is the non-Federal contribution. The benefit to cost ratio is 1.6 to 1.

This report concludes that Federal participation in this project is justified and therefore should proceed to the plans and specifications phase of the project.

NORTH NASHUA RIVER
LEOMINSTER, MASSACHUSETTS

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(excluding those items that have
appeared in the Environmental Assessment)

LEOMINSTER, MASSACHUSETTS

I. INTRODUCTION

1. STUDY AUTHORITY

This investigation has been accomplished under the special continuing authority contained in Section 14 of the 1946 Flood Control Act, as amended to determine the need and feasibility of constructing emergency streambank protection for the "Leominster Connector" along the North Nashua River in Leominster, Massachusetts. The Leominster Connector is a state highway important to the growth and vitality of the city as well as a link in the highway transportation network that includes the interchange of two of the region's major roadways, I-90 and Massachusetts Route 2. Federal assistance to control the erosion adjacent to the Leominster Connector was requested by the city of Leominster in a letter dated January 11, 1989. Under the provisions of the Section 14 authority, Federal construction funding is available for the purpose of protecting highways, bridges, public works and public use facilities from streambank or shoreline erosion. Such work must be economically justified and advisable in the opinion of the Chief of Engineers.

2. STUDY AREA DESCRIPTION

The city of Leominster is located in the northeastern portion of Worcester County in north-central Massachusetts, approximately 34 miles northwest of the city of Boston. Leominster has a generally hilly terrain with elevations ranging from 300 feet NGVD in the east to 1,100 feet NGVD in the west. The North Nashua River flows southeast through the city. The river drops approximately 52 feet within the city's corporate limits. The channel bottom slope adjacent to the project site is approximately 8.0 feet/mile with the drainage area at the site equal to 108 square miles.

Table 1 provides a list of estimated peak flow rates and their recurrence interval as extracted from the revised 1989 Flood Insurance Study for the town.

TABLE 1
Estimated Peak Flow Rates for North Nashua River

<u>Recurrence Interval</u> (years)	<u>Estimated Peak Discharge</u> (cfs)
10	6,000
50	13,000
100	18,000

The Leominster Connector was completed in 1979 and is designed to provide expedient access to the downtown area of the City of Leominster from the interchange at Route 2 and I-90, the major limited access highways in the area. Its functional classification is given as an urban collector. The Leominster Connector features two eastbound and two westbound lanes separated by a median.

The relocated stem of Nashua Street enters from the right just 0.2 miles west of the interchange with Route 2 and I-90. Beyond Nashua Street the embankment below the westbound lanes is eroding severely. Four hundred feet of pavement and guardrail, as well as a storm sewer, are threatened by high flows of the North Nashua River. In the project area the scouring ability of those flows is enhanced by the embankment's location on the outside of an oxbow bend. The embankment is principally comprised of fine sands with a layer of coarse sand and gravel.

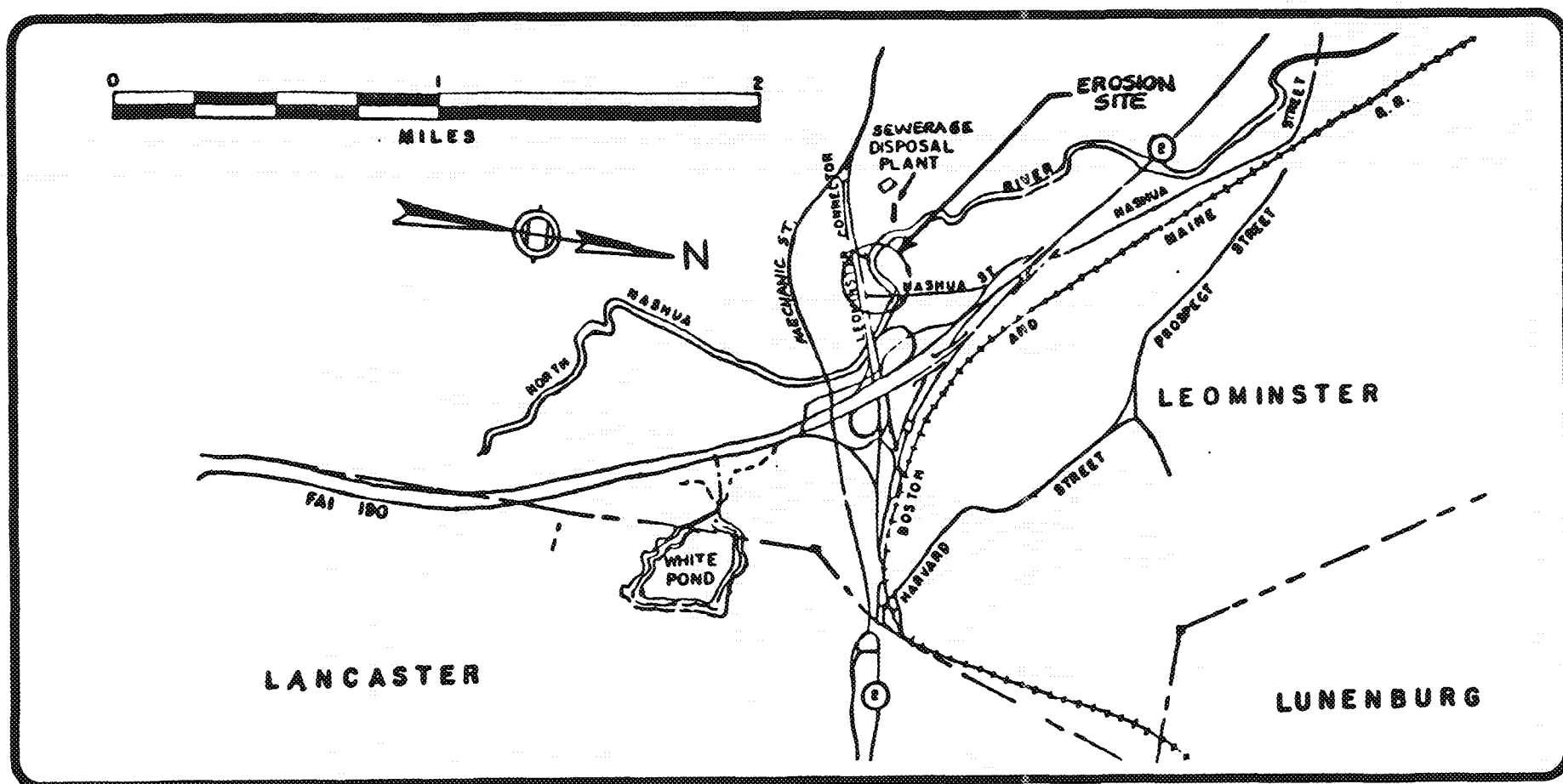
3. Problem Definition

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River in Leominster, Massachusetts. High water velocities are removing fine grained soils at the base of the embankment. This gradual erosion has led to sloughing of soils above the waterline resulting in the edge of the embankment moving closer to the edge of pavement of the nearby roadway. In addition to erosion of the embankment's vertical face, slope stability analysis performed by the Corps revealed another possible failure mechanism where the upper layers of the embankment exhibited a tendency to slide.

Evidence of this type of failure is visible as small, conical intrusions from the otherwise regular edge of the bluff created by the river's flow. The combined effects of these two failure modes has partially undermined a chain link fence that is located less than 25 feet from the edge of the roadway. That roadway, the Leominster Connector, features two travel lanes in both the eastbound and westbound directions separated by a median. The length of the portion of the roadway that is threatened is about equal to that of the eroded slope, approximately 400 feet.

The Massachusetts Department of Public Works (MDPW) instituted a program for monitoring of the slope on March 30, 1989. Results of surveys taken on April 11, 1989 and June 1, 1989 showed the progress of erosion to be up to one foot per week on certain areas of the slope. Consequently, an emergency contract was let by the MDPW on July 5, 1989 for construction of temporary works to curb erosion. These works consist of precast concrete blocks placed in a stepped and staggered pattern on a gravel bed with gravel backfill. The specified length of the project is 310 linear feet. The state inspection and acceptance of the completed work was accomplished on August 10, 1989. The cost that erosion control measure was \$98,000.

This construction, however, must still be considered of a temporary nature. Its as-built length is 310 feet, which is over eighty feet less than the project recommended by this report. The project's intent is to retain soil in areas that are already eroding rather than extend upstream to a point specifically selected as a suitable tie-in. The concrete blocks are not physically tied together by design, and most importantly, the gravel toe and foundation provided is not adequate for a permanent solution. In recognition of this, and pursuant to results of the interagency meeting held on March 30, 1989 the Corps of Engineers has preceded with the formulation of project alternatives at the reconnaissance level.



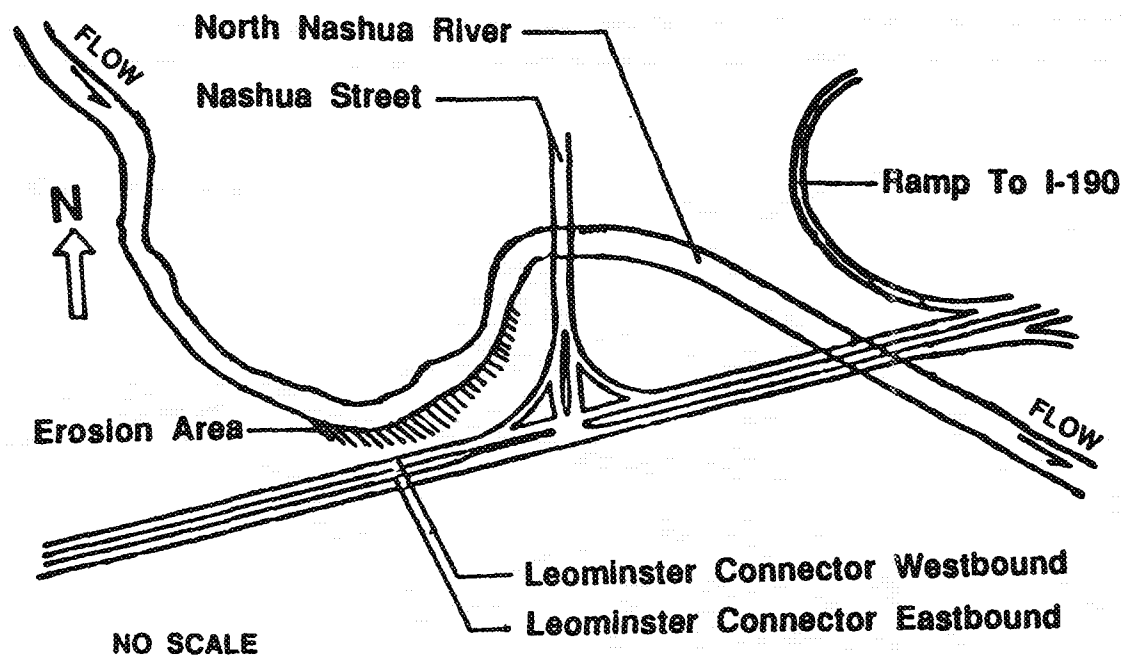
SECTION 14 INVESTIGATION

FIGURE 1: Vicinity Map

Leominster, Massachusetts

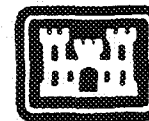


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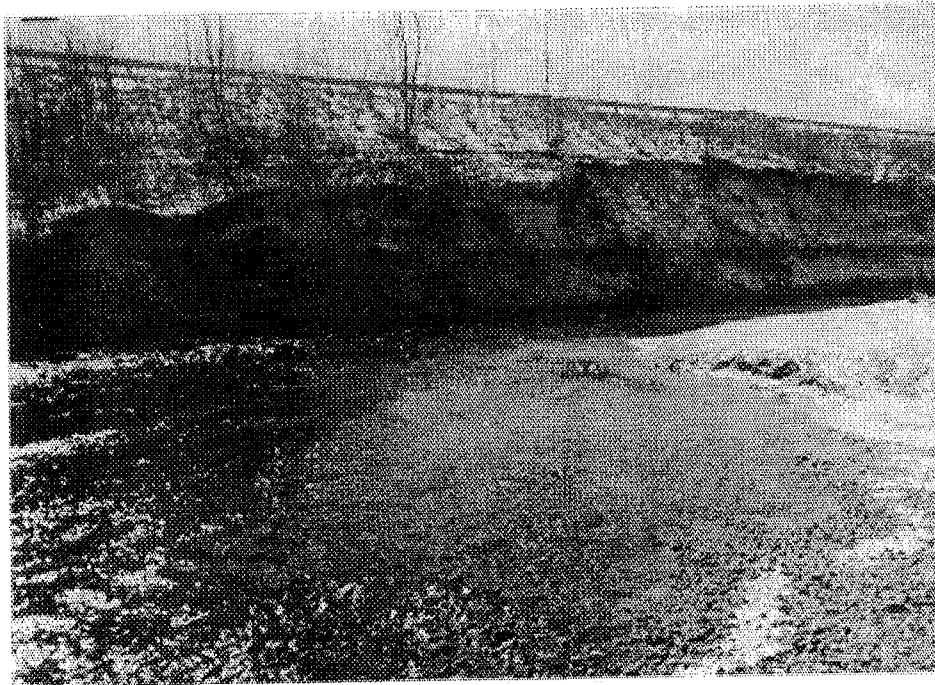


SECTION 14 INVESTIGATION

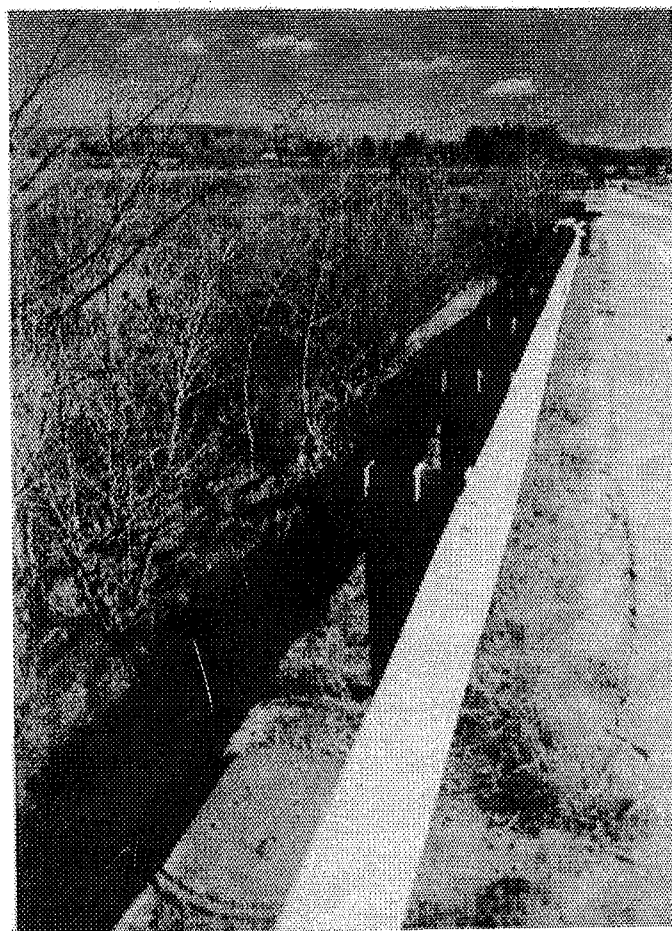
FIGURE 2 : Site Location Map
Leominster, Massachusetts



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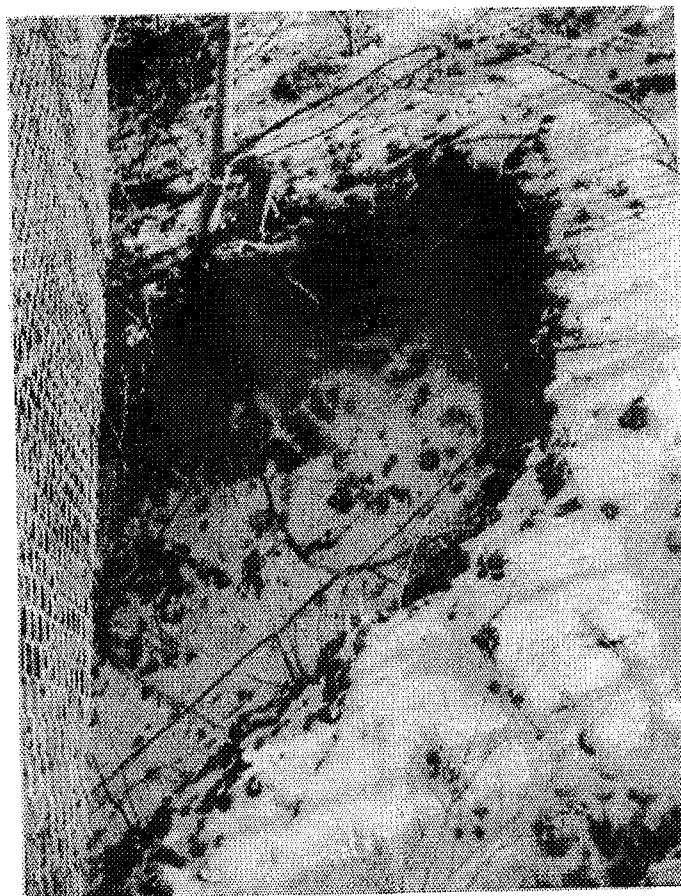
The North Nashua River flows past the eroding embankment of the Leominster Connector with the guardrail for the westbound lanes visible above.



View looking east along edge of pavement of the Leominster Connector. A storm drain is visible in the foreground.



View looking southwest towards upstream limits of the project area.



Looking down at the failure of a conical section of the uppermost layer of the embankment. Note the chain link fence that is undermined.

4. PUBLIC INVOLVEMENT/INTERAGENCY COOPERATION

An initial meeting with City and State officials took place at the Leominster City Hall on February 9, 1989. This meeting provided the focus for an initial field inspection and a determination of the problem's severity and applicability to the Section 14 authority.

A second coordination meeting between Leominster, MDPW and Corps personnel was held at the State Transportation Office Building on March 30, 1989. At this meeting the Corps established its reconnaissance study schedule. A course of parallel activities was adopted in which the Corps would maintain its schedule for determination of a Federal interest followed by report approval and an estimated start of construction in June 1990. The MDPW would undertake a survey to monitor the embankment erosion and prepare an emergency contract that could be let at any time the condition of the roadway embankment was judged to be critical.

On June 1, 1989 the Corps conducted an on-site meeting with representatives of interested natural resource agencies. The purpose of the meeting was to elicit comments on each of the proposed project alternatives with respect to their environmental acceptability. Comments received are incorporated in the Environmental Assessment.

An in-house meeting at the MDPW Chief Engineer's office was held on June 14, 1989. The results of the survey to monitor progress of the streambank erosion prompted the MDPW to declare an emergency situation. Contractors' bids were subsequently accepted on the aforementioned emergency contract.

Corps representatives met with MDPW officials on August 28, 1989 to discuss the details of the proposed Federal project and outline the current regulations applicable to cost sharing the plans, specifications, and construction phase. A joint inspection of the site between the two parties took place on August 31st.

In a letter dated September 12, 1989 the Corps of Engineers provided the Commonwealth of Massachusetts with a copy of the Form Local Cooperation Agreement that is currently applicable to Section 14 projects and asked for the state's support for the project.

II PLAN FORMULATION

1. WITHOUT PROJECT CONDITION

With emergency measures at the Leominster site already implemented by the MDPW, the "no action" alternative means that no Federal project shall be built. In that instance, it is expected a gradual undermining of the concrete block wall will occur. This reflects exposure of the temporary works to high flows at the upstream end as well as the presence of a gravel toe that does not reflect Corps of Engineers' standards.

According to the MDPW there is no specific "design life" beyond assuring soil retention along the embankment and the safety of the Leominster connector in the immediate future. It is projected that the temporary protection would wash out and be rebuilt every 4 years over the 25 year life of the recommended plan. Traffic delays and other costs associated with the repairs would be experienced. Each successive incident would likely require more fill than the last in order to replace what was washed away. This condition would also be detrimental to environmental conditions in the area. The overall length of the eroded reach would also be expected to increase due to a lack of hardened tie-in points for the emergency work.

2. PLAN 1 - GABION WALL

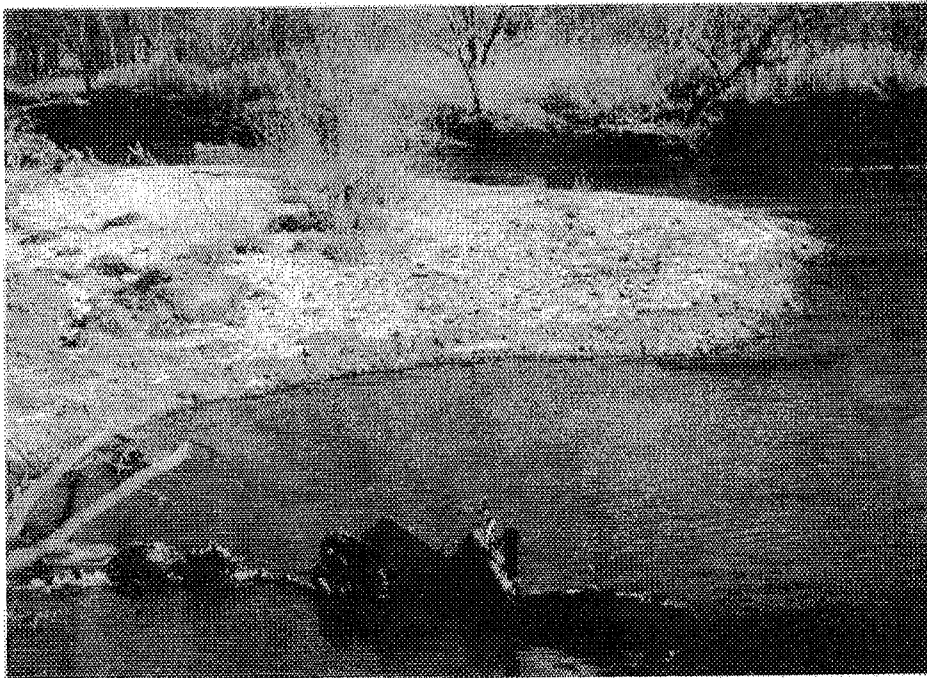
The feasibility of constructing a gabion wall was studied. This method of erosion control and slope stabilization was an attractive option from the standpoint of minimizing on site excavation and the degree of rechannelization required. However, the gabion wall proved too costly when compared to the estimated project benefits. A typical cross section for the gabion wall is shown on Figure 3.

3. PLAN 2 - GRID BLOCK REVEIMENT

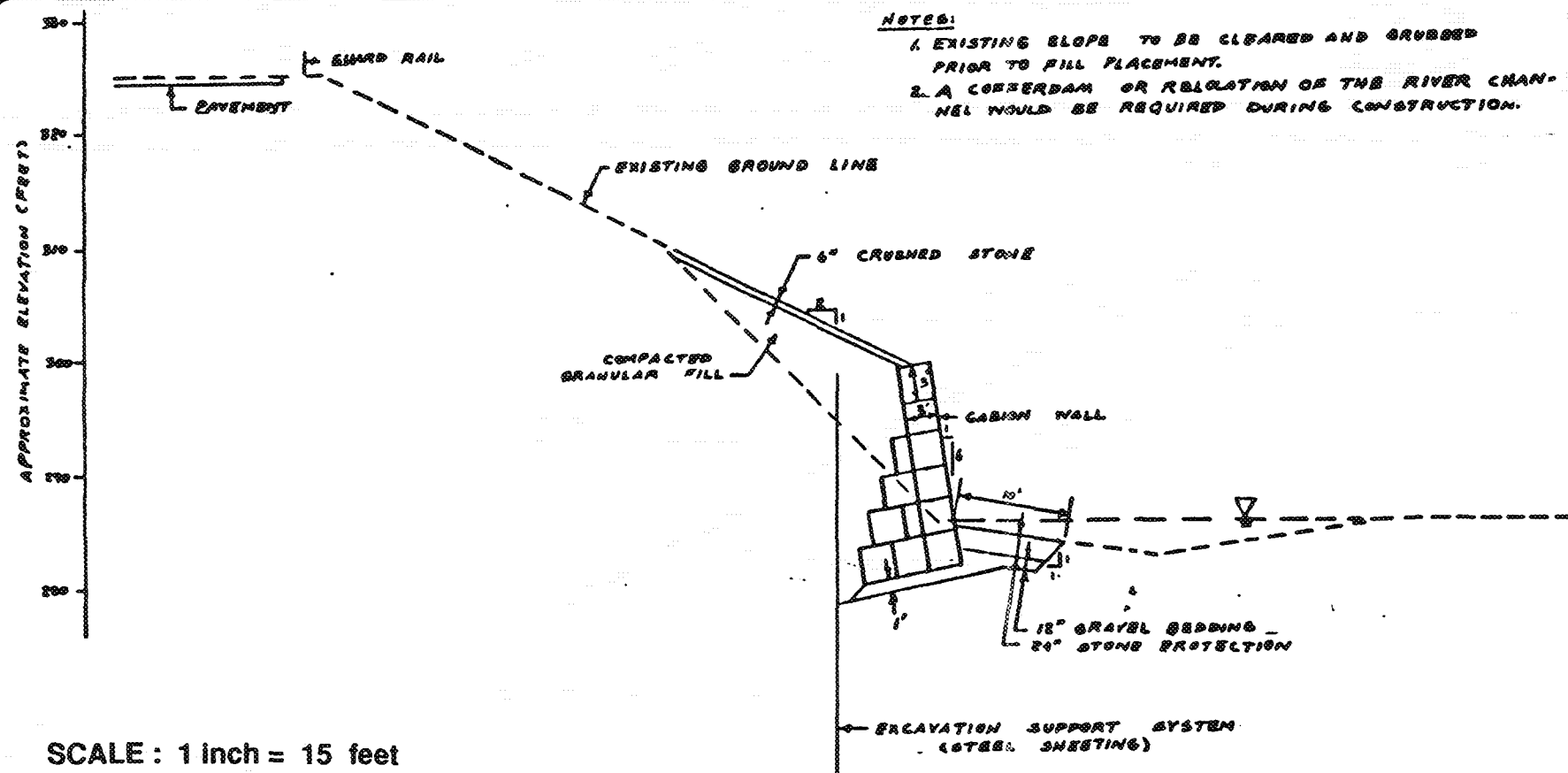
This alternative would be built on a 2 to 1 finish slope where the grid blocks provide the facing of the toe and slope up to an elevation approximately twelve feet above the channel invert. Partial rechannelization of the North Nashua River would be required within the project limits. A grid block revetment would provide effective slope protection and enhance the project areas visual appeal by allowing some degree of slope revegetation through the openings between the blocks. The cost of this plan was higher than that for the competing stone revetment. A typical cross section for the grid block revetment is shown on Figure 4.



**Streambank erosion adjacent to Leominster Connector
as viewed from near the Nashua Street bridge.**



**This bar has been formed by sediments deposited on
the inside of the oxbow bend opposite the erosion area.
This area will be excavated to accomodate the partially
relocated channel.**



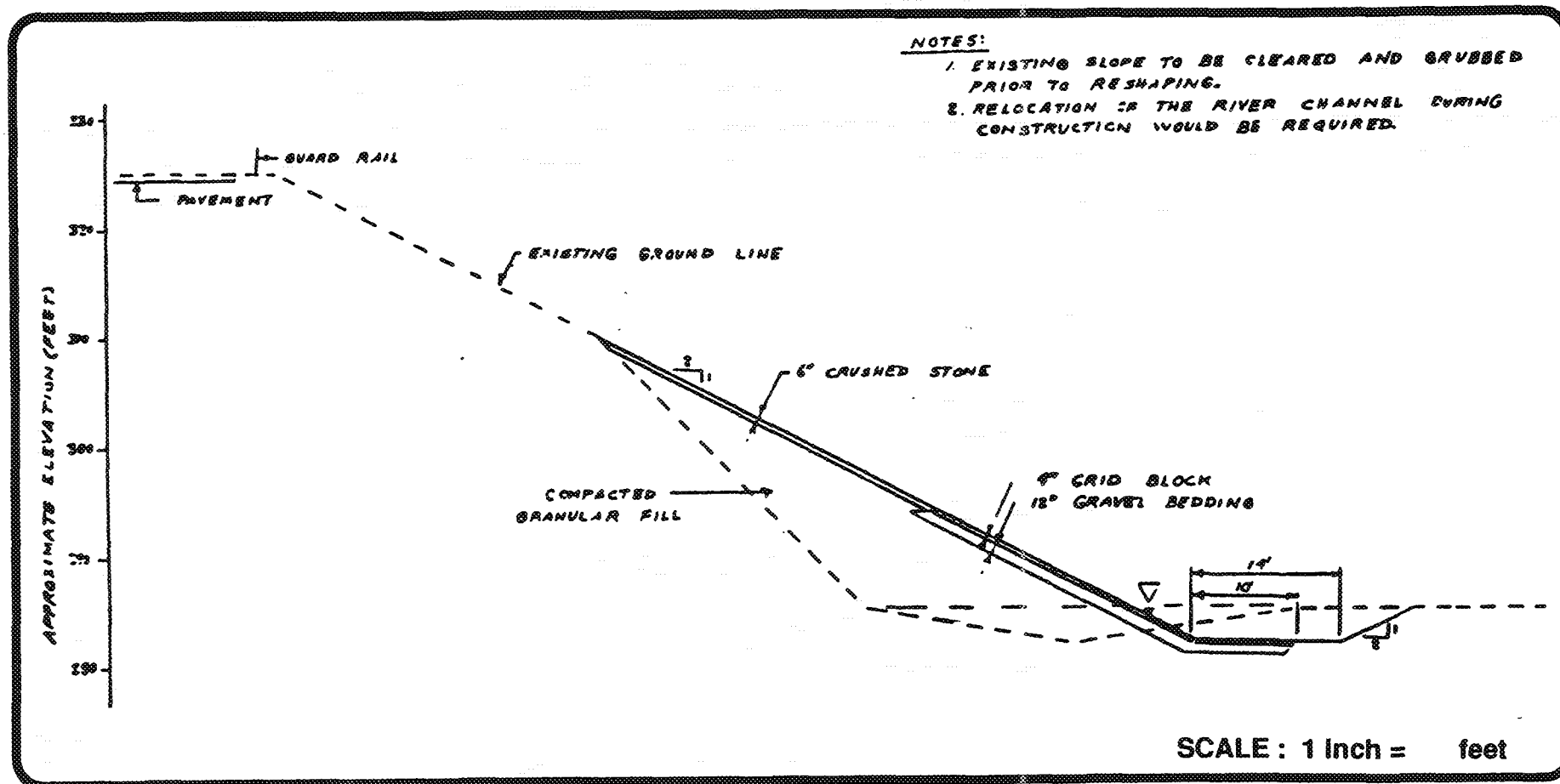
SECTION 14 INVESTIGATION

FIGURE 3: Typical Section For Proposed Gabion Wall

Leominster, Massachusetts



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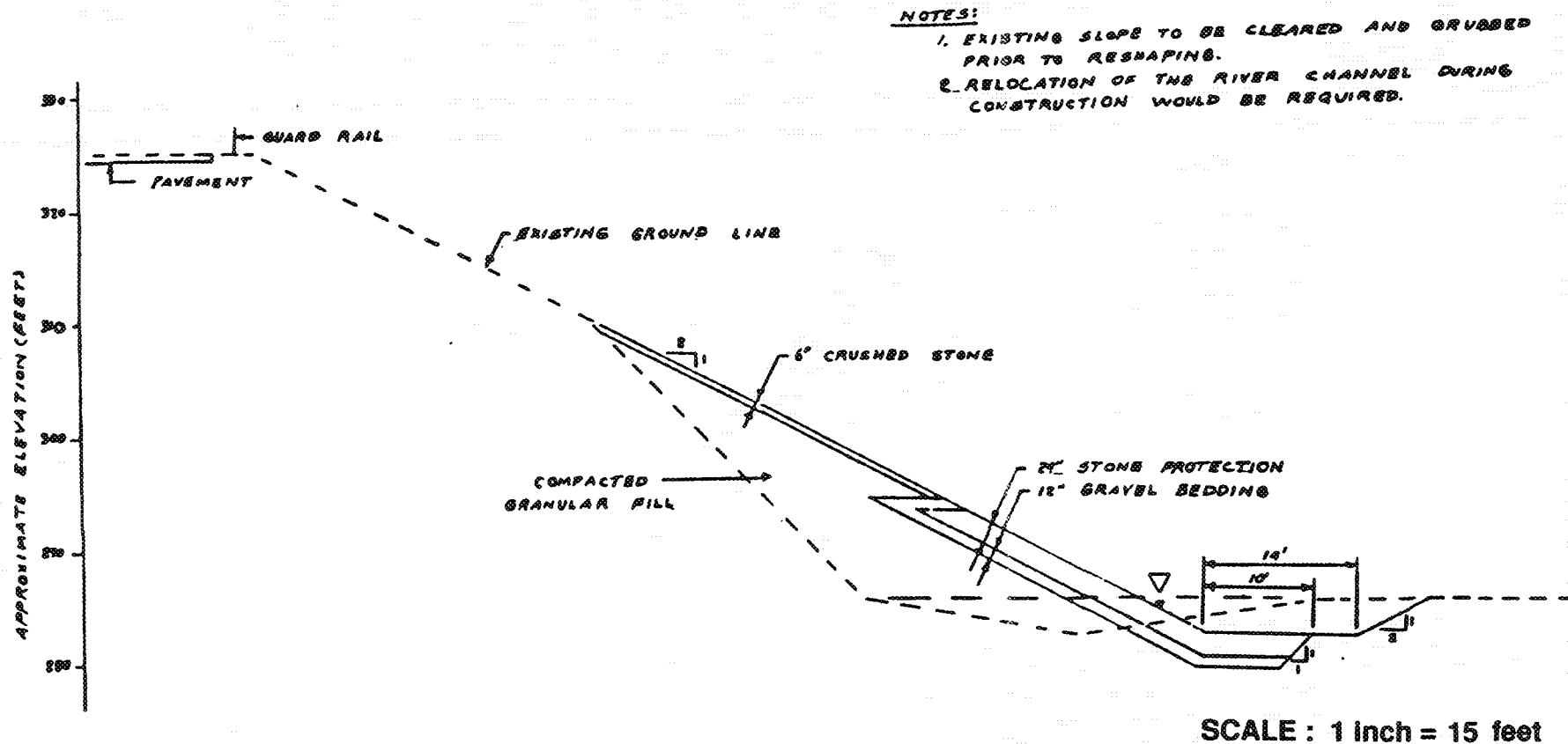
SECTION 14 INVESTIGATION

FIGURE 4: Typical Section For Proposed Grid Block Revetment

Leominister, Massachusetts



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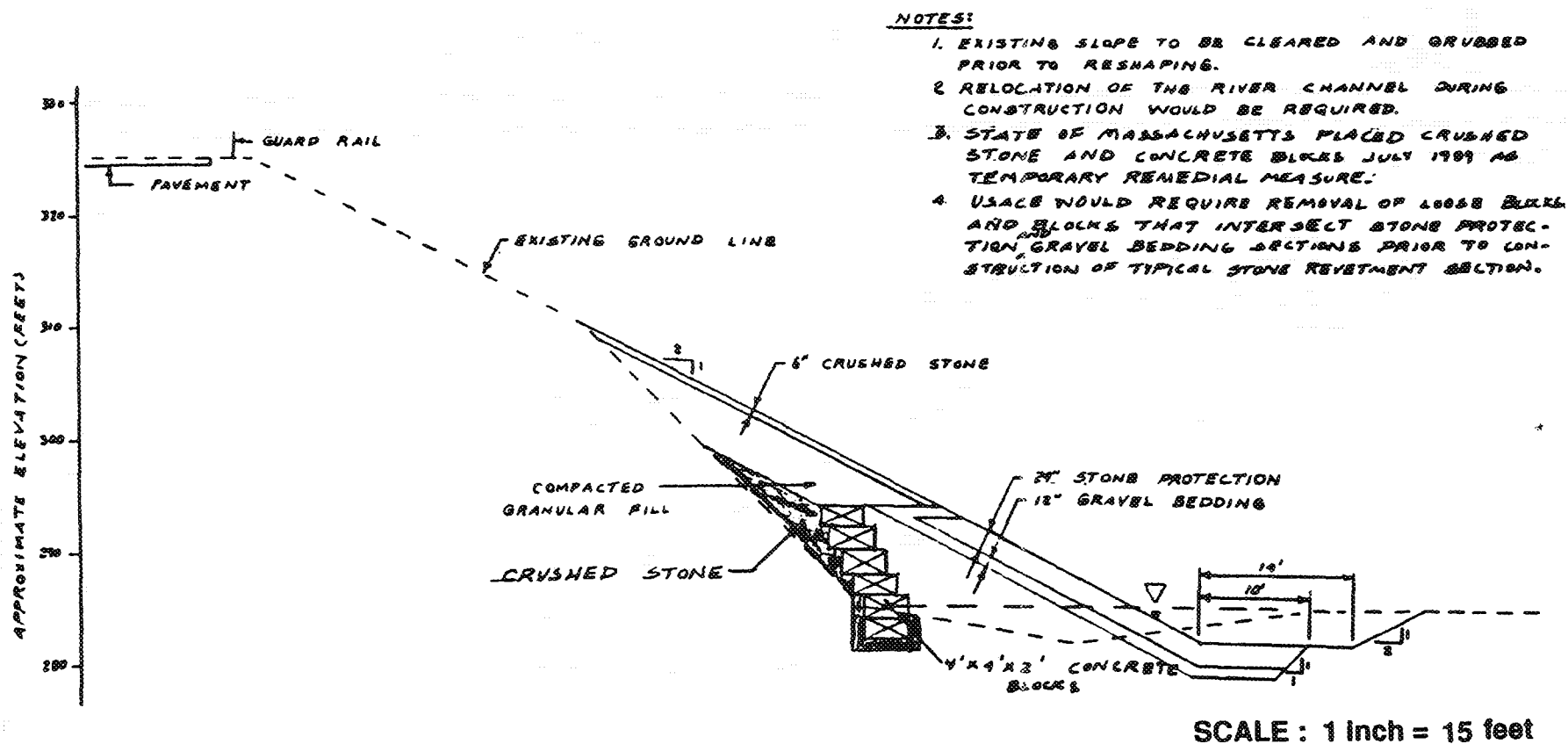


SECTION 14 INVESTIGATION

FIGURE 5 : Typical Section For Proposed Stone Revetment
Leominster, Massachusetts



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SECTION 14 INVESTIGATION

FIGURE 6 : Typical Section For Selected Plan, Superposition of Stone Revetment Over Existing Temporary Block Wall

Leominster, Massachusetts



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New England Division

4. PLAN 3 - STONE REVETMENT

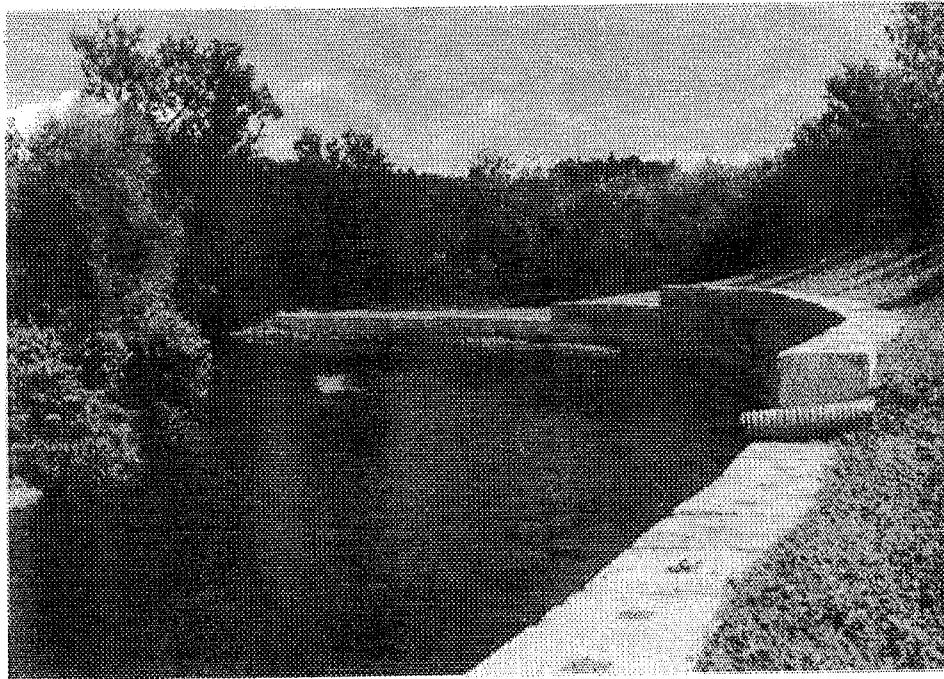
Another alternative would be the construction of a stone revetment. The preliminary design featuring a 2 foot layer of stone protection over a 1 foot minimum layer of gravel bedding over fill would both halt the erosion along the bend and stabilize the slope. The stone revetment cross section would be similar to that of the grid block revetment where the finished slope is 2 horizontal on 1 vertical. The minimum D⁵⁰ size of stone protection required is 1 foot diameter. The stone revetment as completed would require partial rechannelization of the North Nashua River within the expected limits of the project, a distance of not less than 400 feet. See Figure 7 for site plan.

The maximum intrusion of the stone revetment into the existing channel would occur at the center section of the project area corresponding to the maximum height of the existing slope. This distance is estimated to be 30 feet excluding the "toe". This alternative, for which a typical cross section appears on Figure 5, was chosen as the selected plan.

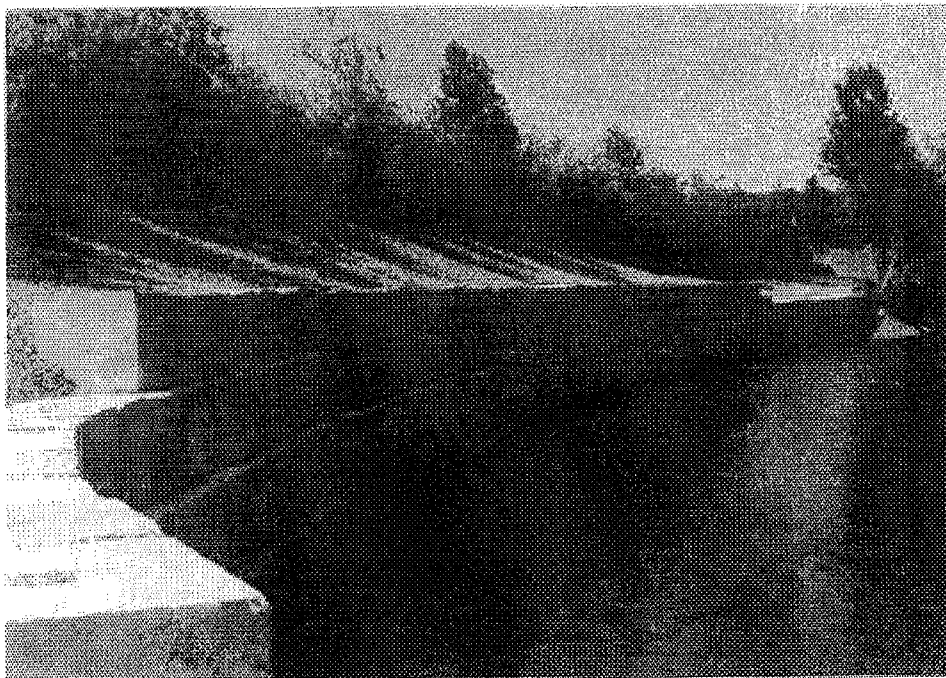
III THE SELECTED PLAN

1. THE SELECTED PLAN

The selected plan must have annualized project benefits that exceed annualized project costs while maximizing net benefits when compared to competing plans. The stone revetment described above would provide a solution to the erosion problem that is both feasible from an engineering standpoint and economically justified. The planned four-hundred feet of stone protection would encompass the entire threatened reach from an upstream limit near the mouth of an existing drainage ditch to a point downstream where the oxbow bend transitions to a reverse stream curvature approaching the bridge opening at relocated Nashua Street.



Looking downstream at the MDPW project .



Looking upstream at the MDPW project . Much of the stone placed to protect the lower course of blocks has washed away in this photo taken less than four weeks from the date of its completion .

Hydraulic analysis for riprap design was provided using theories in accordance with EM 1110-2-1601. Riprap protection was determined utilizing a design discharge of 18,000 cfs for the estimated 100-year flood event. For this event, assuming side slopes of 2H:1V, at an estimated water depth of 16 feet and an estimated energy gradient of 1.6 feet/mile, a minimum D50 stone size of 1.0 foot is required to protect the embankment. However, layer thickness and associated rock sizes were also evaluated to insure that the riverbank protection constructed is vandal resistant.

Construction of the MDPW emergency repair was concurrent with the preparation of this report, therefore the following alterations to the presentation of details of the recommended plan are:

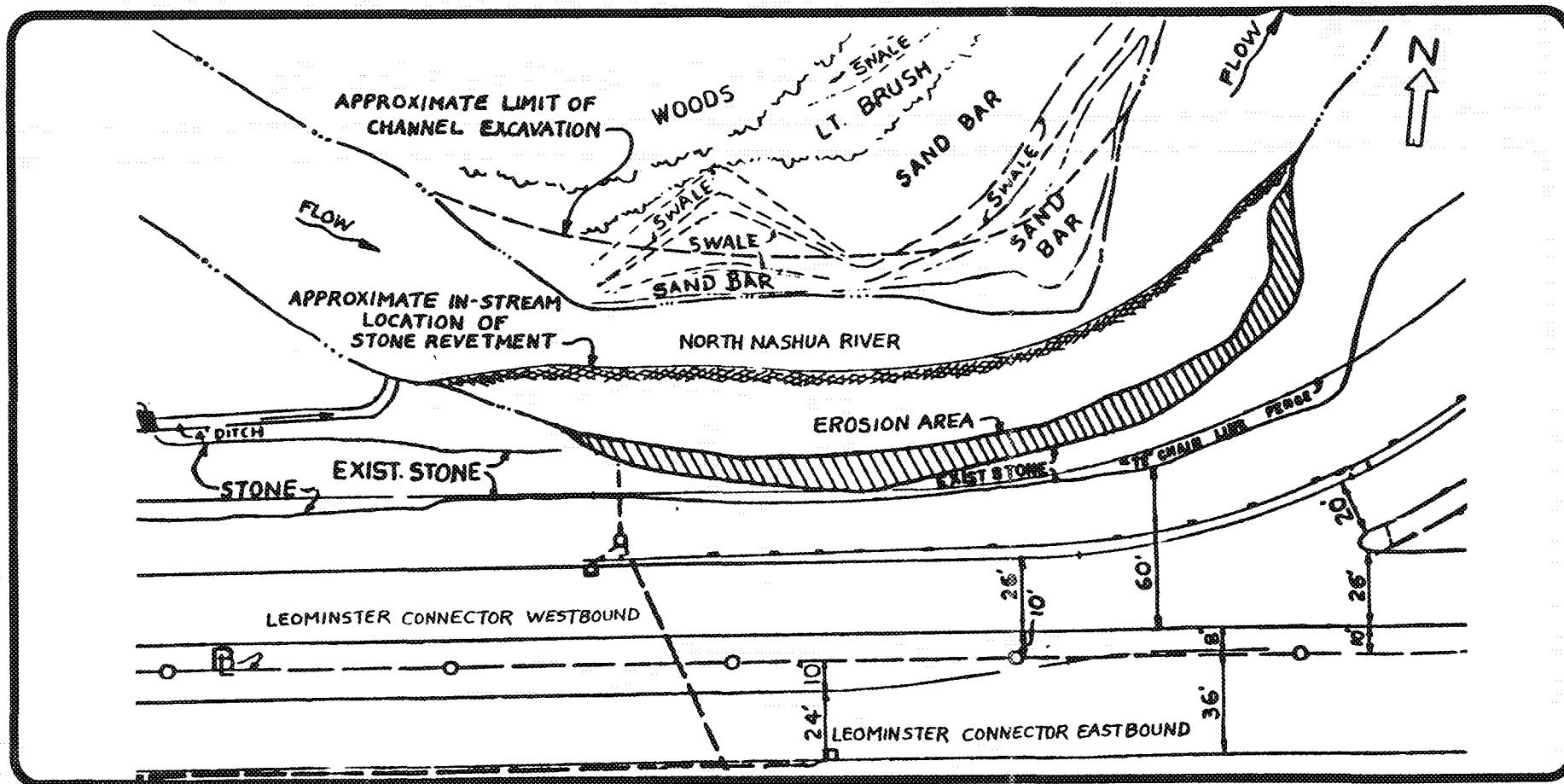
- * Construction of the recommended stone revetment solution can be implemented by removing courses of concrete block from the top of the existing work and superimposing the stone revetment over the remainder of the concrete block wall. The major portion of the temporary streambank protection will not have to be removed. See Figure 6.
- * Costs associated with removal of the blocks will be offset by a lesser amount of fill required for construction of the planned revetment.

2. ESTIMATES OF FIRST COSTS AND ANNUAL CHARGES

A detailed estimate of Federal and non-Federal first costs and annual charges for the proposed project are presented in Table 2. The lands and easements required for project construction are owned by either the Commonwealth of Massachusetts or the city of Leominster. The required non-Federal share is twenty-five percent of the project costs.

Of the total project first costs of \$221,000 the Federal share would be \$165,800 and the non-Federal share would be \$55,200.

Total project annual costs of \$23,800 were computed assuming a project life of 25 years and an interest rate of 8 7/8 percent. This includes an estimated annual maintenance cost of \$1,500.



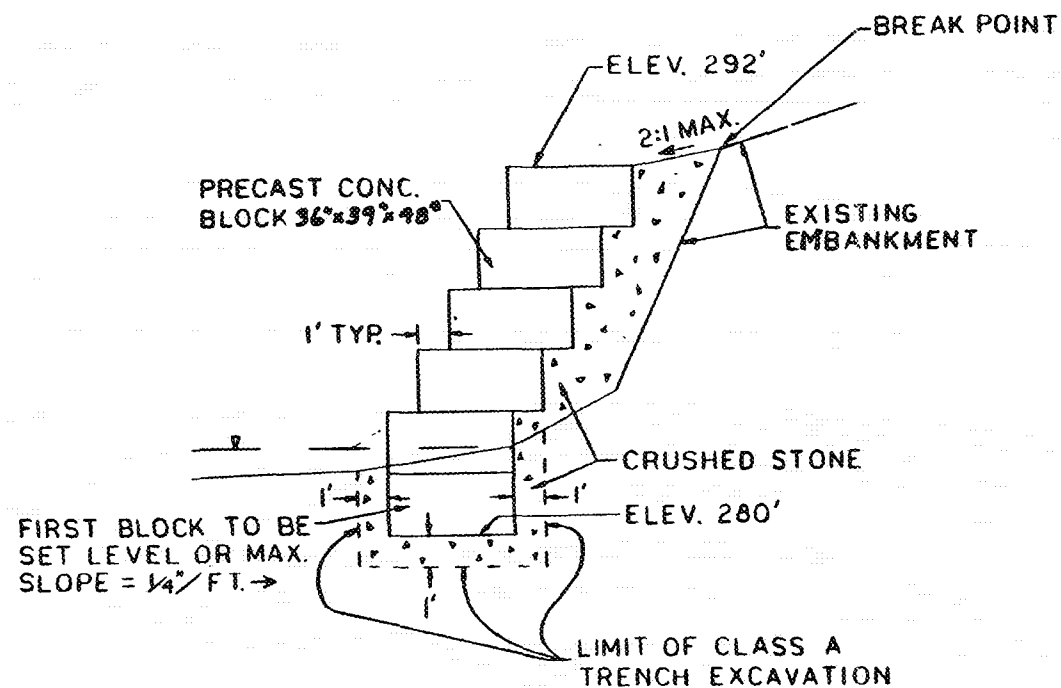
SECTION 14 INVESTIGATION

FIGURE 7 : Site Plan For Stone Revetment Alternative, Project Limits and Rechannelization Area Are Indicated

Leominster, Massachusetts



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New England Division

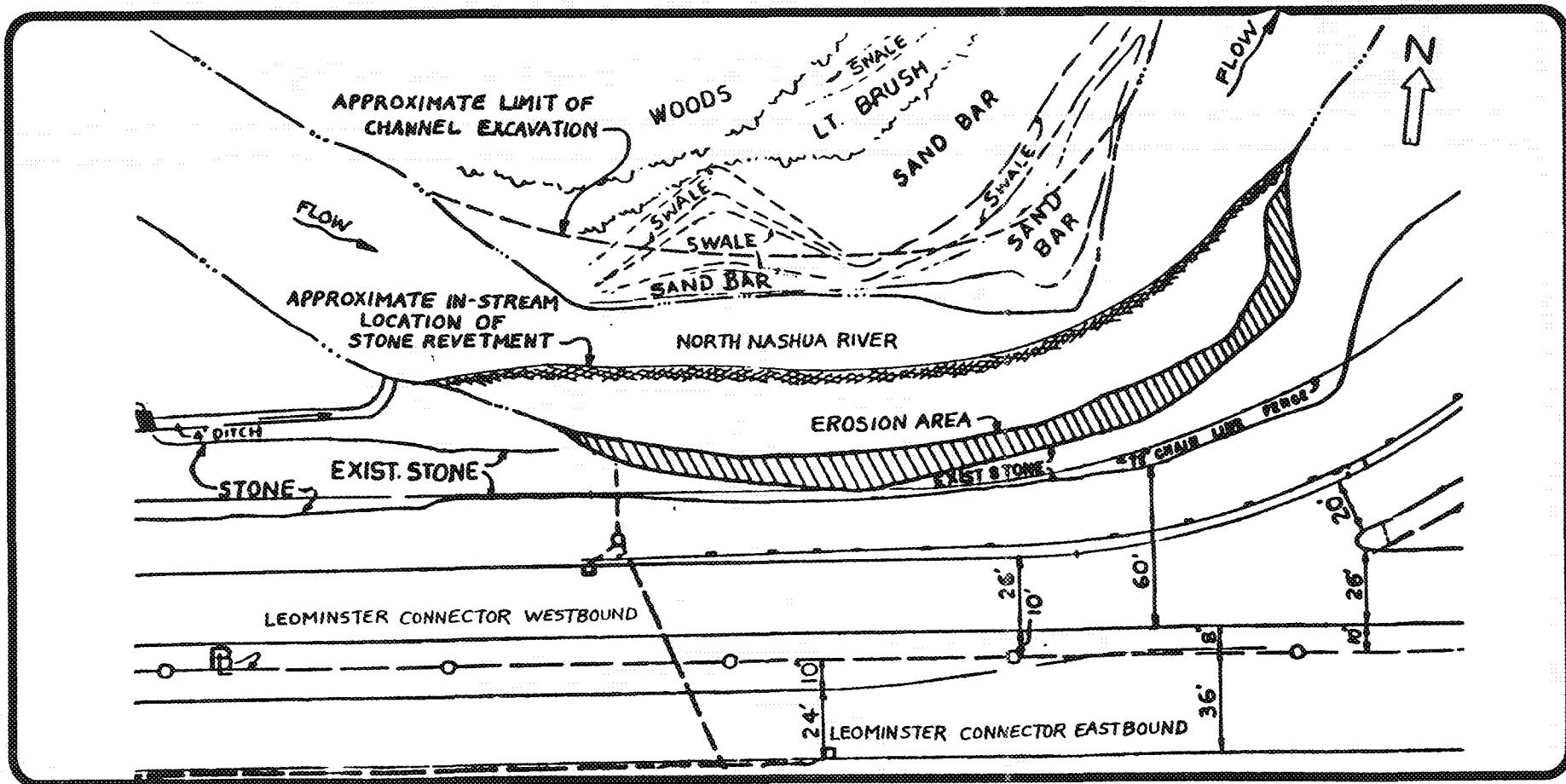


SECTION 14 INVESTIGATION

FIGURE 8 : Typical Section For Existing MDPW Emergency Repair
Leominster, Massachusetts



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SECTION 14 INVESTIGATION

FIGURE 7: Site Plan For Stone Revetment Alternative, Project Limits and Rechannelization Area Are Indicated
Leominster, Massachusetts



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TABLE 2
PROJECT FIRST COSTS AND ANNUAL CHARGES
NORTH NASHUA RIVER, LEOMINSTER, MASSACHUSETTS
(July 1989 Price Level)

<u>Item</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Cost</u>
Site Preparation	1	Job	\$15,000	\$ 15,000
12" Layer of gravel bedding	650	C.Y.	20	13,000
24" Layer of stone protection	1100	C.Y.	40	44,000
6" Layer of crushed stone	250	C.Y.	20	5,000
Compacted granular fill	3960	C.Y.	15	60,000
Channel excavation	1000	C.Y.	3	<u>3,000</u>
		Subtotal		<u>\$140,000</u>
		Construction Contingency (use 15%)		<u>\$ 21,000</u>
		SUBTOTAL		<u>\$161,000</u>
		Engineering and design		\$ 40,000
		Supervision and administration		<u>20,000</u>
		Total First Cost		<u>\$221,000</u>
		Federal Share (75%)		\$165,800
		Non-Federal Share (25%)		\$ 55,200
<u>ANNUAL COSTS</u>				
Federal				\$ 16,700
Non-Federal (includes \$1500 for annual maintenance)				7,100
Total Annual Cost				<u>\$ 23,800</u>

3. ESTIMATES OF BENEFITS AND BENEFIT TO COST RATIO

Benefits associated with a project to provide erosion control and slope stabilization adjacent to the Leominster Connector are represented by costs saved due to project implementation. Partial washouts of the temporary work are envisioned over a twenty-five year period. With each occurrence, the following costs will be experienced:

- * emergency slope repair
- * restoration of roadway to service
- * emergency traffic controls and monitoring of the site by police
- * detours of traffic during the loss of service period
- * post-construction monitoring by survey crew

Analysis indicated that losses due to a partial washout would be approximately \$179,000. The cost of embankment repair over twenty-five years would be \$39,000 annually based on an interest rate of 8 7/8 percent. The annual cost of the selected plan is \$23,800 and its benefit to cost ratio is 1.6 to 1. The net annual benefit is equal to \$15,200. A detailed economic analysis is contained in Appendix A.

A comparison of costs and benefits computed for each of the three alternatives is shown in Table 3.

TABLE 3
A COMPARISON OF THE ALTERNATIVE PLANS OF PROTECTION

Plan	Total First Cost	Annual Cost	Annual Benefits	Net Benefits
1. Gabion Wall	\$600,000	\$62,000	\$39,000	---
2. Grid Block Revetment	\$405,000	\$42,300	\$39,000	---
3. Stone Revetment	\$221,000	\$23,800	\$39,000	\$15,200

4. ENVIRONMENTAL AND CULTURAL RESOURCE ANALYSIS

No significant environmental impacts are expected to occur during or after construction of the erosion protection project. Construction activities will probably cause increased turbidity in the North Nashua River for a short period, but should have no permanent effect on water quality. Efforts will be made to minimize sediment inputs into the North Nashua River caused by construction activities by use of erosion control measures such as silt fencing. Completed coordination with relevant State and Federal agencies indicated no significant impact on fish and wildlife habitat is expected due to project construction. A detailed Environmental Assessment and Finding of No Significant Impact (FONSI) are included in this report.

No significant impacts on lands of historic or cultural importance is envisioned due to project implementation. The roadway embankment for the Leominster Connector is constructed on a landfill, and the stone revetment will be, for the most part, built over the existing temporary erosion control work. A brief report on historic and archaeological resources along with a letter of concurrence from the Massachusetts Historical Commission appears in the Environmental Assessment.

5. REQUIREMENTS OF LOCAL COOPERATION

State and local officials are aware of the requirements of local cooperation for participation in an emergency streambank protection project along the North Nashua River in Leominster, Massachusetts. Officials of the Commonwealth of Massachusetts reviewed the draft Local Cooperation Agreement and understand the following requirements of Local Cooperation:

1. Provide without cost to the United States, all lands, easements, rights-of-way, and utility relocations necessary for project construction.
2. Hold and save the United States free from damages due to the construction, operation and maintenance of the project, except where such damages are due to the fault or negligence of the United States or its contractors.
3. Maintain and operate the project after completion without cost to the United States in accordance with regulations prescribed by the Secretary of the Army. Annual operation and maintenance costs are currently estimated to be \$1500 includes, but is not limited to, inspection, patchwork, etc.
4. Contribute 25 percent of actual cost of construction and preparation of Plans and Specifications. A minimum cash contribution of 5 percent of these costs is required. Non-Federal contribution is currently estimated at \$55,200. Final cost sharing amounts will be determined when the project design is substantially complete and real estate appraisals made.
5. Assume the responsibility for all costs in excess of the Federal cost limitation of \$500,000. Current project costs are estimated at \$221,000.
6. Prevent future encroachment which might interfere with proper functioning of the project.

IV CONCLUSIONS

This study concludes that construction of a stone revetment on the slope would provide permanent erosion control along the North Nashua River streambank in order to prevent future undermining and failure of the Leominster Connector. The selected plan provides a technically sound solution to the problem and can be constructed without wholly dismantling the existing temporary project. Inspection and analysis of the existing MDPW constructed protection measures indicates adequate stability for temporary protection of the embankment. However a flood event could cause damage to the structure.

The selected permanent protection plan would be complete within itself and is considered to be the NED plan, as it maximizes net benefits. The total non-Federal cash required for construction of this project would be \$55,200. The proposed stone revetment design is acceptable to the local sponsor. In a letter dated 26 March 1990, the Commonwealth of Massachusetts, as the local sponsor, states that it supports the proposed Federal project and intends to meet the requirements and obligations as stated in the Local Cooperation Agreement.

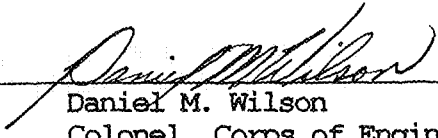
V RECOMMENDATIONS

I recommend that this report be approved as the basis for preparation of plans and specifications for construction of the selected plan described herein under authority contained in Section 14 of the 1946 Flood Control Act, as amended. It is further requested that the New England Division, Division Engineer be designated the authority to approve construction plans and specifications.

The recommendations contained reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted for authorization and/or implementation funding. However, prior to transmittal, the sponsor, the state, the interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

Date

4 Jun 90


Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer

ACKNOWLEDGMENT

This report was prepared by the New England Division of the United States Army Corps of Engineers, under the general direction of Colonel Daniel M. Wilson, Division Engineer, Project Supervision was provided by Mr. F. William Swaine, Chief, Project Development Section, Mr. Nicholas E. Avtges, Chief, Plan Formulation Branch, and Mr. Joseph L. Ignazio, Chief, Planning Division.

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ENVIRONMENTAL ASSESSMENT AND FONSI

ENVIRONMENTAL ASSESSMENT
Finding of No Significant Impact
and
Section 404 (b) (1) Evaluation
Section 14
Emergency Streambank Protection

LEOMINSTER, MASSACHUSETTS

prepared by:

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August 1989

New England Division
U.S. Army Corps of Engineers
Waltham, Massachusetts

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I. INTRODUCTION

A. Purpose and Need

This report provides an assessment of the environmental affects of an emergency streambank protection project designed to stabilize a section of riverbank along the North Nashua River, located in Leominster, MA (see Figure 1). Streambank erosion is threatening the Leominster Connector (a state road) and if not stabilized will undermine the road and result in its loss.

B. Project Authority

This report was prepared under the special continuing authority contained in Section 14 of the 1946 Flood Control Act (as amended). Section 14 allows the Corps of Engineers to participate in the planning and construction of economically justified streambank erosion control projects in situations where public facilities are threatened.

II. PROJECT DESCRIPTION

A. Selected Plan - Stone revetment

Project plans call for the construction of a stone revetment with a one foot vertical to two feet horizontal slope along 400 feet of riverbank as shown in Figure 2. The revetment will extend from the river channel up to the Leominster Connector. It will consist of compacted granular fill overlain with six inches of crushed stone on the upper bank and 12 inches of gravel bedding overlain with 24 inches of stone protection on the lower bank. Permanent relocation of the river channel will be required. Excavation of the new channel will start at the downstream end of the project. Excavated material will be used as granular fill for the base of the proposed revetment and used to breach the present North Nashua River at the upstream end. Approximately 5,000-7,000 cubic yards of granular fill, 1200 of which will be placed in the present river channel, will be required to construct the project. The stone revetment will extend from approximately five feet near the ends to 40 feet at the midpoint into the river channel.

A temporary access road, constructed parallel to the Leominster Connector upstream of the project, does exist due to Massachusetts Department of Public Works temporary emergency stabilization procedures. Construction is expected to occur during the summer of 1990 and is expected to last approximately three months.

B. Alternatives

1. Gabion Wall

A gabion wall bulkhead was considered the first option in lieu of the stone revetment. This option would extend 0 to ten feet into the channel and require temporary rechannelization during construction and would require partial permanent rechannelization (see Figure 3). This option was rejected due to lack of economic justification.

2. Alternative Protection Methods

Stone and grid block revetments, and wood, steel, concrete, and double-wall bulkheads were also considered as means for reducing the erosion problem and increasing the bank stability. Permanent rechannelization would be required with the revetment alternatives while temporary rechannelization would be required with the bulkhead alternatives. These options were rejected due to lack of economic justification.

3. No Action

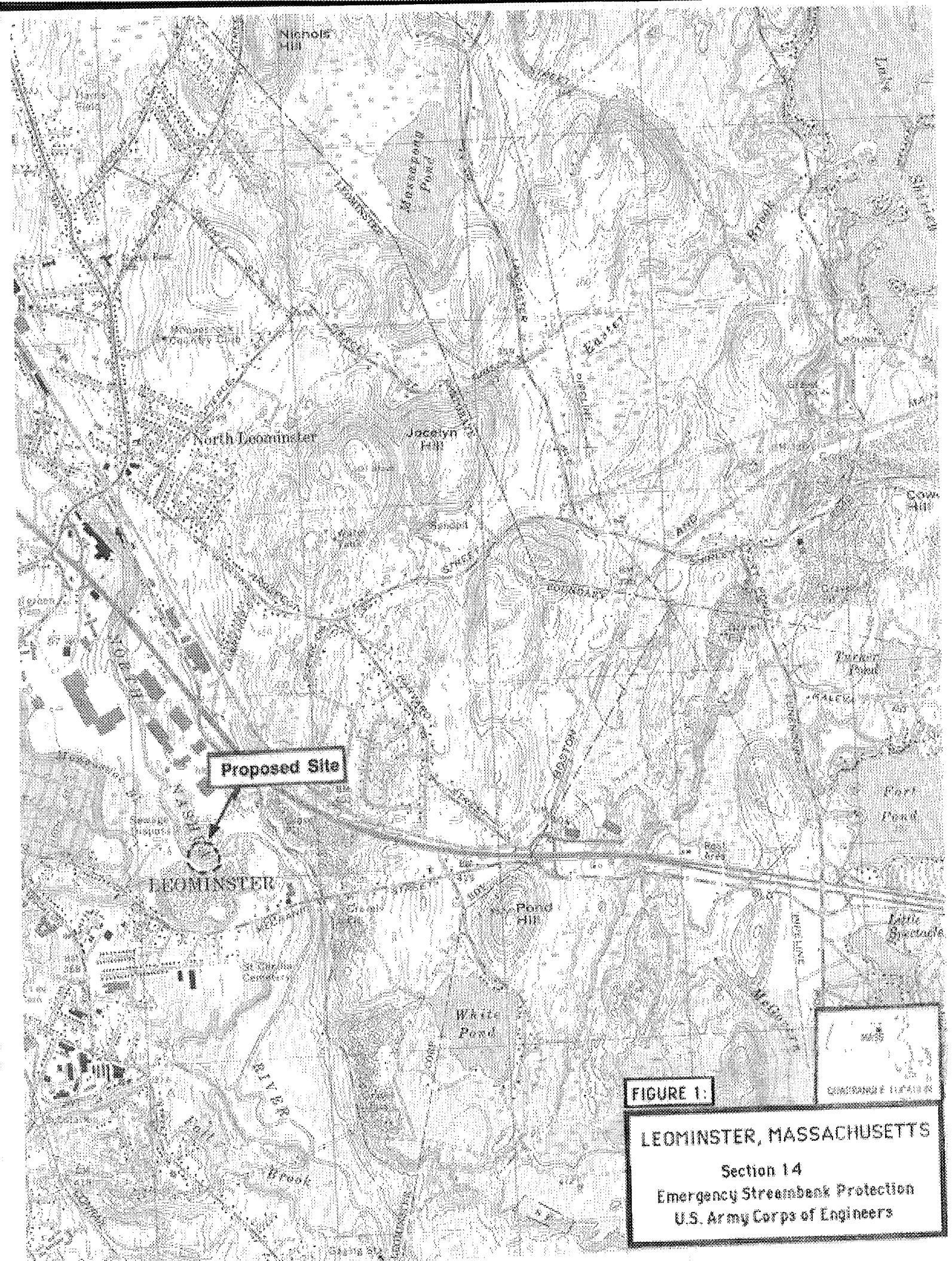
If no action is taken to stabilize the eroding riverbank, erosion will continue, eventually resulting in the loss of a portion of the Leominster Connector. Based on that impact, this option was considered unacceptable.

III. GENERAL SETTING

A. Introduction

The city of Leominster is located in the northeastern portion of Worcester County in north-central Massachusetts, approximately 38 miles northwest of the city of Boston. Leominster has a population of 34,318 (1980 census).

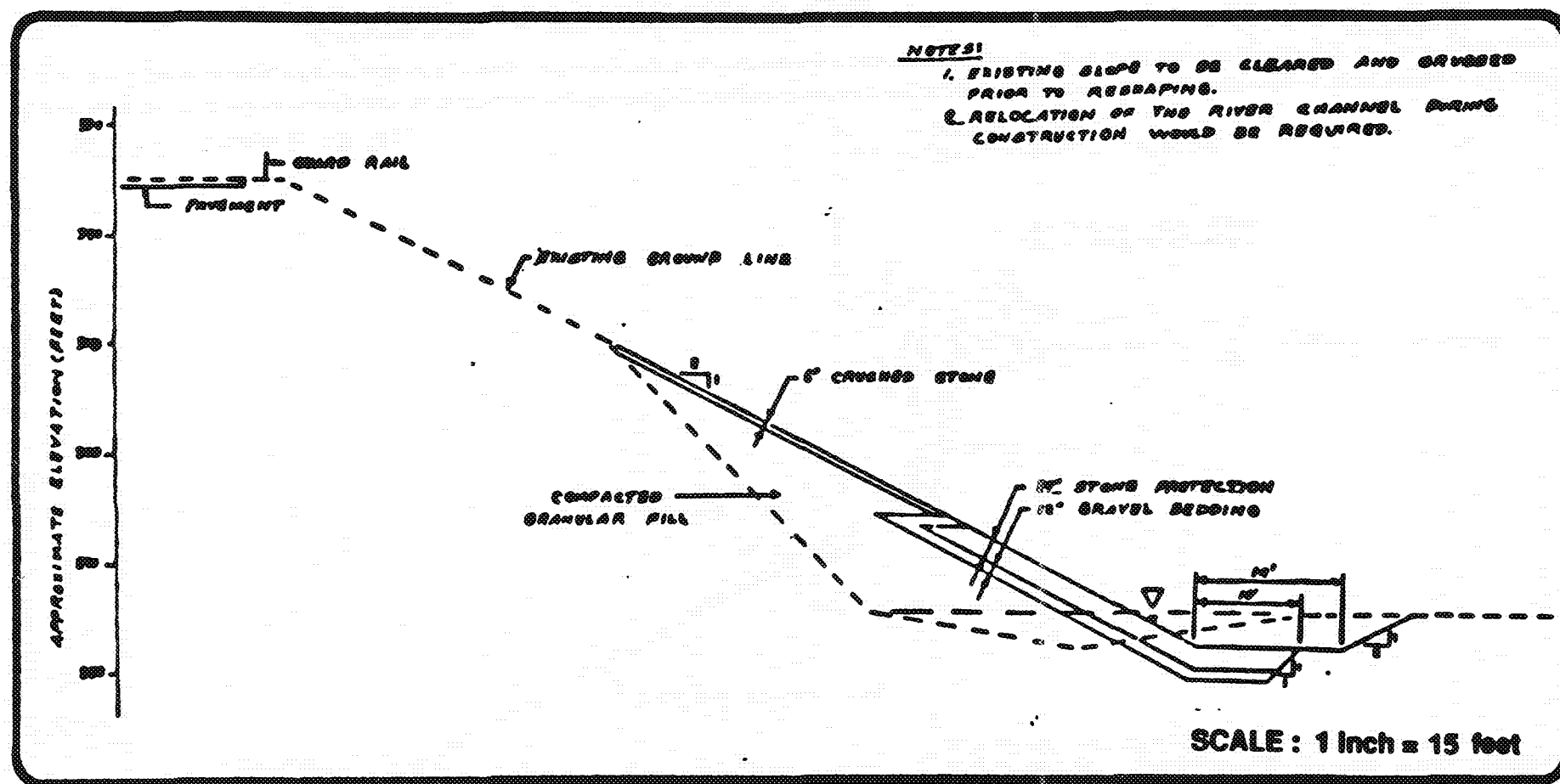
The North Nashua River flows southeast through the city dropping approximately 52 feet within the city's corporate limits. The project site is an immature oxbow located in the forested floodplain of the North Nashua River. The project site is adjacent to the old Leominster Sanitary Landfill. Soils on the site are primarily of sand and gravel (Universal Engineering Corporation, 1977). Upstream of the project site is the Leominster Wastewater Treatment Facility, operated by Environtech Operating Services, Inc. (EOS). EOS processes approximately 4.5 million gallons of septage for the City of Leominster per year.



Proposed Site

FIGURE 1:

LEOMINSTER, MASSACHUSETTS
Section 14
Emergency Streambank Protection
U.S. Army Corps of Engineers

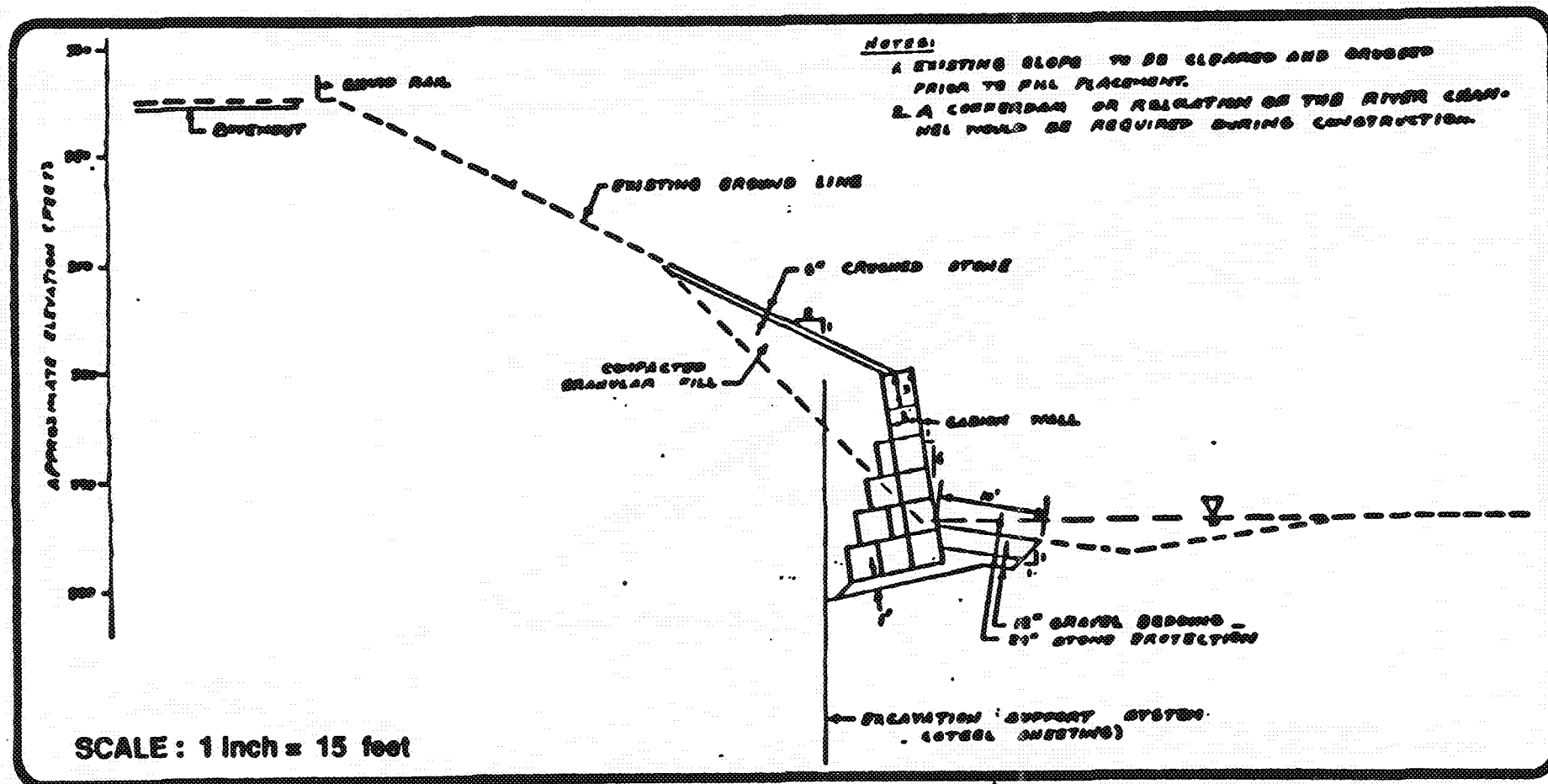


SECTION 14 INVESTIGATION

FIGURE 2 Typical Section For Proposed Stone Revetment
Leominster, Massachusetts



US Army Corps
of Engineers
New England Division



SECTION 14 INVESTIGATION

FIGURE 3

Typical Section For Proposed Gabion Wall

Leominster, Massachusetts



US Army Corps
of Engineers
New England Division

B. Aquatic and Riparian Habitat

In the project area, the channel substrate consists of small rocks, gravel, and sand (visual observation). The channel bottom slope adjacent to the project site is approximately 8.0 feet/mile with the drainage area at the site equal to 108 square miles (COE Hydrologic and Hydraulic Assessment, April, 1989). The flow rate was estimated at approximately five feet per second and capable of eroding the fine sand in the bank. During an eight week observation period, some of the 400 foot bank has been estimated at eroding one foot per week. This did occur during the flood season.

The project is located in a forested riparian floodplain. A 1977 Environmental Assessment by the Universal Engineering Corporation indicated the site to be stripped floodplain habitat. Flood litter encompasses the area as well as discarded tires. The area has recovered to support a variety of wildlife along the North Nashua River.

C. Water Quality

Presently, the North Nashua River has been classified as a Class B waterway and as such is designated for uses of protection and propagation of fish, other aquatic life and wildlife; and for primary (i.e. swimming) and secondary contact recreation (i.e. boating).

Data supplied from a 1985 report of the Nashua River Basin indicates dissolved oxygen levels to be lowest during the summer months, reaching a lowest of 6.7 mg/l during July and having the highest levels of 11.8 mg/l during March. Temperature ranges were from 42 degrees F in March to 68 degrees F in July and September. Mr. Robert Madore, Aquatic Biologist, of the Massachusetts Division of Fisheries and Wildlife indicated the Nashua River does not meet water quality standards during the summer months (telephone conversation 9 March 1989).

Adjacent to the proposed project area is the Leominster Wastewater Treatment Facility. The facility uses Advanced Wastewater Treatment to remove ammonia, nitrogen, and phosphorus. Releases of treated effluent into the North Nashua River occur just upstream of the proposed project area. The facility met 99% of NPDES discharge requirements for 1988, providing a high degree of treatment for the protection of aquatic life in the Nashua River.

D. Aquatic Resources

1. Aquatic Invertebrates

During a site visit 15 June 1989 samples indicated populations of Chironomids, Oligochaeta, and Diptera, within the aquatic substrate. These are common invertebrates of freshwater streams and ponds.

2. Fish

A stream survey by the Massachusetts Division of Fisheries and Wildlife (1974-1975) determined that white suckers (Catostomus commersoni) and largemouth bass (Micropterus salmoides) are present in the project area. Mr. Madore confirmed that no followup surveys have been accomplished in the Nashua River since 1975, but anticipated that the fish populations may have increased due to an improvement in the water quality of the river (telephone conversation 9 March 1989). The channel substrate is an excellent spawning ground for fish species as well as riffle and pool areas which support fish populations.

In a letter date 22 June 1989, the U.S. Fish and Wildlife Service reported a warm water fishery in the river segment affected by the environment. Species include bass (Micropterus sp.), pickerel (Esox sp.), fallfish (Semotilus corporalis), suckers (Family Catostomidae), and bullhead (Ictalurus sp.).

E. Riparian Resources

1. Vegetation

With the exception of the exposed soils along the eroding riverbank, the floodplain corridor supports a variety of vegetation types which provide nesting, escape, and breeding cover to fish and wildlife. Grasses, shrubs, and small to medium sized saplings and pole-sized tree species constitute a medium to dense riparian habitat. Beyond the immediate river channel, the floodplain topography elevates approximately three to four feet. Dominant taxa include sycamore (Platanus occidentalis), birch, (Betula sp.), red maple (Acer rubrum), willow (Salix sp.), boxelder (Acer negundo), staghorn sumac (Rhus typhina), reed canary grass (Phalaris arundinacea), and smartweeds (Polygonum sp.). Table 1 lists field observations of species during site visits of 1 March and 15 June 1989 as well as by other agencies.

2. Wildlife

The riparian corridor provides habitat for a variety of wildlife including songbirds, small mammals, reptiles and amphibians, and white-tailed deer (Odocoileus virginianus). Most of these species require the terrestrial vegetation (i.e. trees, shrubs, grasses) for food, cover, and nesting habitat. Some wildlife species observed during the site visits of 1 March and 15 June 1989 include mourning doves (Zenaidura macroura), American goldfinch (Spinus tristis), tree and bank swallows (Iridoprocne bicolor and Riparia riparia), American robin (Turdus migratorius), and garter snake (Thamnophis sirtalis). The U.S.F.W.S., in a letter dated 22 June 1989, listed grey squirrel (Sciurus carolinensis), eastern cottontail rabbits (Silvilagus floridanus), great blue heron (Ardea herodias), and belted kingfisher (Ceryle alcyon) as occurring in the project vicinity. Additionally, Ed Himlan of the Nashua River Watershed Association reported a nesting pair of Red-tailed hawks (Buteo jamaicensis), as well as beaver (Castor canadensis), and sightings of river otters (Lutra canadensis) within the area (telephone conversation 18 July 1989). It can be expected waterfowl and a variety of small mammals regularly use the area. Tables 2 and 3 give the observed species of wildlife from all agencies made during site visits as well as species which would be expected to find with additional sampling in the project area.

F. Threatened/ Endangered Species/ Species of Special Concern

In a letter dated 7 June 1989 the U.S. Fish and Wildlife Service indicated the potential for populations of the small whorled pagonia (Isotria medeolides), which have been documented in Worcester County. This will be addressed in the environmental impact section.

Aside from the small whorled pagonia, the U.S. Fish and Wildlife Service indicated no Federally listed or proposed threatened species occur within the project area, with the exception of occasional transient individuals. The Massachusetts Natural Heritage and Endangered Species program also concurred there are no known state rare, endangered, or species of special concern of either animal or plant communities within the project area.

G. HISTORIC AND ARCHAEOLOGICAL RESOURCES

Affected Environment

The proposed project area has no archaeological potential. The southern streambank in this area has undergone severe erosion and as much as ten feet of the bank has washed away. In addition to the effects of erosion, the southern streambank has been modified by construction of I-190 and the Leominster Connector, and the temporary fill and concrete wall which has been erected by the DPW. Therefore, any sites which may have been present would have been disturbed or destroyed by the combined effects of all of these activities.

The northern streambank has also been severely disturbed in the past. The topsoil was removed from this area in the 1960s and used for agriculture. The streambank was also periodically inundated by flood waters. The floodwaters removed fine particles from the remaining subsoil and left a highly eroded terrain. During construction of the highway and Leominster Connector this area was studied, as it was included in the right-of-way for the highway project. Mitigation measures for the northern streambank created a wetland habitat by excavating sand and gravel deposits and stabilizing the riparian habitat. Any archaeological sites which may have been present would have been destroyed by these land modifications.

IV. ENVIRONMENTAL IMPACTS

A. Access Road

Construction of a temporary access road parallel to the

project site will result in the loss of all terrestrial vegetation. Vegetation in the area is primary early successional species and should regenerate quickly. Soil compaction from construction equipment will hinder regeneration. Due to Massachusetts Department of Public Works temporary emergency measures, this road already exists.

B. River Relocation

Construction activities for relocation of the river channel will begin on the downstream side of the project area. Channel migration at the project site has moved the North Nashua River Channel migration approximately 40 feet south since the construction of the Leominster Connector in 1977. This is the cause of the current erosion control measures. Relocation will return the river to its 1977 location.

Construction equipment will be required to cross the North Nashua River upstream of the project site. A temporary culvert will be placed across the stream to prevent destruction of the aquatic habitat. Rechannelization will result in permanent loss of all aquatic habitat within the existing riverbed as well as loss of all riparian habitat in the newly created channel. This loss is acceptable given the dynamic forces of the oxbow at the project site. There is sufficient area in the forested floodplain to accommodate a minor channel shift. All riffle and pool areas within the 400 foot reach will also be permanently lost. Creation of the new river channel will bring 30-35 feet of new aquatic habitat. Effects of increased turbidity will be reduced with the placement of appropriate siltation devices prior to the commencement of any construction activities. Increased turbidity and suspended solids in the water column will occur with the relocation. This will be temporary and given the estimated rate of erosion of the existing riverbank, the relocation and stabilization of the river channel will have a positive effect on the level of sedimentation influx and turbidity into the river.

A temporary staging area for the material removed from the newly excavated channel will be required (see also Section 404(b)(1) evaluation). The temporary location will be within close proximity of the construction site so it can be easily accessed as fill material for the revetment. This close proximity will minimize impacts of fill material on vegetation within the riparian corridor.

C. Aquatic and Riparian Habitat

Construction activities and channel relocation will eliminate existing aquatic habitat along the approximately 400

feet of riverbank. All riffle and pool areas will be destroyed. The irregular, eroding natural bank will be replaced with a homogenous uniform graded slope.

Approximately 0.5 to 0.75 acres of riparian habitat will be lost within the project area. Herbaceous shrubs above the eroding riverbank as well as riparian habitat located in the floodplain will be eliminated. Providing topsoil over the stone revetment and revegetation after construction will aid in mitigation and will be covered below.

D. Water Quality

Construction activities will result in temporary increases in the suspended solids load and turbidity in the North Nashua River. Given the scope of the project, and the flow volume during the summer low flow period, the short term impact on the water quality will be localized. Downstream effects on aquatic habitat and water quality will be minimal. Input of suspended solids and turbidity can be minimized by working during the low flow season and placement of appropriate siltation devices downstream.

E. Aquatic Resources

1. Aquatic Invertebrates

Construction activities at the work site will destroy the existing aquatic invertebrate community. Stone at the base of the revetment will provide a suitable habitat for recolonization. In the newly relocated river channel, given the potential for recruitment from upstream habitats and the short regeneration time of aquatic invertebrate species, recolonization should occur rapidly (Nunnally and Shields, 1985). The stone will most likely support invertebrate species similar to the already existing rocky substrate.

2. Fish

Rechannelization of the river channel will have no significant impacts on finfish populations because the new river channel will have a cross-sectional area similar to the existing oxbow. Depth and flow velocities will be critical in mitigation. Increased suspended sediment concentration will be minimal given the rechannelization will be outside the stone revetment construction zone and appropriate siltation devices are present. Fish are generally tolerant of short term exposure to moderate levels of suspended sediments (Stern and Stickle, 1978).

Once rechannelization occurs, no barriers to hinder river flow will be present. The impact on fish traversing the North Nashua River will be minimal.

F. Riparian Resources

1. Vegetation

Construction will result in the loss of riparian habitat along the approximately 400 feet of the river as well as the shrubs and small trees above the eroding riverbank. Loss of vegetation along the eroding bank would occur to some extent even if no action were taken. Loss of the vegetation will be offset, to an extent, by planting grasses and shrubs or herbs on the revetment. Additional information concerning the revegetation plan is provided below.

2. Wildlife

The U.S. Fish and Wildlife Service cited an immediate concern regarding the loss of bank swallow nest sites in the eroding riverbank (letter dated 22 June 1989). Nest sites were visible during the site visit of 15 June. The Migratory Bird Treaty Act (16 U.S.C. 703-711) prohibits the taking of migratory birds, eggs, or nest sites. Bank swallows usually return to New England beginning in mid-April and begin nest construction by the first week of May. Young of the year are expected to be fledged by the end of July. Construction activities at the site will be scheduled to occur between August 1 and April 30 to avoid the nesting period.

Wildlife and other birds inhabiting the project area will be displaced by construction activities. It would be desirable to conduct construction activities during late summer or early fall to minimize disruption to birds, including waterfowl, and mammals breeding or nesting in the project area.

Construction of the revetment will most likely result in the long term loss of potential breeding habitat for wildlife species which nest in the riparian corridor. Revegetation of the revetment after completion of construction will be beneficial for species which nest in herbaceous vegetation and grasses.

The project will also most likely decrease habitat value for mammals, such as beaver, but provide higher quality habitat for mice, shrews, and raptors.

G. Threatened/Endangered/Species of Special Concern

In a telephone conversation with Jay Copeland

(Environmental Reviewer, Massachusetts Natural Heritage Program) the small whorled pagonia would not be located in the riparian floodplain of the project area. Therefore, this project is expected to have no impact on any species considered threatened, endangered, or of special concern by the U.S. Fish and Wildlife Service or the State of Massachusetts (see correspondence from Gordon Beckett, U.S.F.W.S., 7 June 1989; and Jay Copeland, M.N.H.P., 26 May 1989).

H. Cultural Resources

Impacts

The proposed project area has been extensively disturbed by erosion and land modifications during construction of I-190 and the Leominster Connector, as well as construction of the temporary emergency stabilization project by the DPW. Therefore, the proposed emergency streambank protection project is unlikely to have an effect upon any structure or site of historic, architectural or archaeological significance as defined by the Natural Historic Preservation Act of 1966, as amended. The Massachusetts Historic Commission has concurred with this determination.

V. ACTIONS TO MINIMIZE ENVIRONMENTAL IMPACTS

A. Timing of Construction

Work will occur during late summer or early fall (August through November), when water levels in the North Nashua River are at or near seasonal lows. This time frame would minimize any adverse affects on water quality, eggs and larvae of anadromous and resident fish species, and on wildlife which inhabit the riparian corridor.

This time frame would also comply with federal regulations regarding the taking of migratory birds, eggs, or nests (16 U.S.C. 703-711). Bank swallow nests were present in the eroding riverbank.

B. River Relocation

A temporary culvert will be placed for construction equipment initially crossing the river prior to to the relocation activities. Placement of appropriate siltation devices at this time would also reduce the impacts to the aquatic ecosystem. Avoidance of unnecessary impacts regarding water quality and aquatic habitat will be incorporated into the project specifications.

The construction of a new river channel should have a cross-sectional area similar in size to the existing river channel as well as providing riffle and pool areas which parallel the present North Nashua River oxbow. The channel substrate should be reestablished. Any alteration of the cross-sectional area, including pool areas, could have adverse affects on the reestablishment of the aquatic invertebrate and fish populations.

C. Habitat Enhancement/Preservation

1. Aquatic Habitat

The stone revetment will provide suitable habitat for aquatic invertebrates and fish. Any submerged logs or snags in the river channel, not in the immediate construction area, should be left in place to provide shelter for fish. Any large logs or rocks excavated during construction will be placed in the base of the revetment.

2. Riparian Habitat

Following construction, all disturbed areas will be seeded and mulched to prevent superficial erosion. The upper bank of the revetment will be backfilled with topsoil, planted with grasses or clover to prevent erosion, and planted with low growing trees and shrubs such as dogwood (Cornus sp.) and willow (Salix sp.). This will provide compensation for lost wildlife food, nesting and cover habitat as well as provide a buffer zone between the riparian floodplain and the Leominster Connector for aesthetics.

3. Access Road

Restoration and revegetation of the temporary access road will be performed following construction.

VI. CORRESPONDENCE

A. Personal Communication

The following were coordinated with in the preparation of this report.

Cheryl Poirier, Massachusetts Department Environmental Protection

Ed Himlan, Nashua River Watershed Association

Rich Dorfman, Massachusetts Division of Water Pollution Control

Steve Robb, Massachusetts Natural Heritage Program

Bob Carlton, Massachusetts State Board of Health

Bob Modore, Massachusetts Division of Fisheries and Wildlife

Ed Reiner, U.S. Environmental Protection Agency, Boston

B. Correspondence

1. Project information letters were mailed to the following prior to the preparation of this report.

Daniel Greenbaum, Massachusetts Department of Environmental
Quality Engineering

Douglas A. Thompson, U.S. Environmental Protection Agency
Wayne MacCallum, Massachusetts Division of Fisheries and
Wildlife

Gordon E. Beckett, U.S. Fish and Wildlife Service
Jay Copeland, Massachusetts Natural Heritage Program
Cornelius O'Leary, Massachusetts Division of Water Pollution
Control

Richard Horgan, Massachusetts Department of Public Works
John DeVillars, Massachusetts Executive Office of
Environmental Affairs

2. Correspondence Received

The following letters were received concerning the project (see Appendix, page 17):

Gordon E. Beckett, U.S.F.W.S., 22 June 1989 and 7 June 1989
Jay Copeland, Massachusetts Natural Heritage Program,
22 May 1989

3. A site visit was made 1 March 1989 and 15 June 1989 to inform attending state and local agencies as well as with interested parties to discuss any concerns. The following were in attendance during the 15 June meeting:

David Larsen, Corps of Engineers, New England
Division (NED)
Paul Schimeifenyg, NED
Kerrin Dame, NED
Kirk Bargerhuff, NED
John Galli, Massachusetts Department of Public Works
Nabil Hourani, Massachusetts Department of Public Works
(Geotechnical)
Hasmukh Patel, Massachusetts Department of Public Works
(Highway Division)
Carl Melberg, Massachusetts Department of Public Works
(Environmental)
Dick Reynolds, Massachusetts Department of Public Works
(Environmental)
Patricia Trombly, Massachusetts Department of Public
Works (Environmental)
Phil Nadeau, Massachusetts Department of Environmental
Protection
Ed Himlan, Nashua River Watershed Association

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VIII. COMPLIANCE WITH ENVIRONMENTAL FEDERAL STATUTES AND
EXECUTIVE ORDERS

Federal Statutes

1. Preservation of Historic and Archaeological Data Act of 1974, as amended, 16 U.S.C. 469 et seq.

Compliance: Not Applicable

2. Clean Air Act, as amended, 42 U.S.C. 7401 et seq.

Compliance: Coordination and Public Notice of this report upon request to the Regional Administrator of the Environmental Protection Agency for review pursuant to Sections 176c and 309 of the Clean Air Act signifies partial compliance.

3. Clean Water Act of 1977 (Federal Water Pollution Control Act Amendments of 1972) 33 U.S.C. 1251 et seq.

Compliance: A Section 404(b)(1) Evaluation and Compliance Review have been incorporated into this report. An application shall be filed for State Water Quality Certification pursuant to Section 401 of the Clean Water Act.

4. Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1431 et seq.

Compliance: Not Applicable; project is not located within the State designated coastal zone.

5. Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq.

Compliance: Coordination with the U.S. Fish and Wildlife Service (FWS) has yielded no formal consultation requirements pursuant to Section 7 of the Endangered Species Act.

6. Estuarine Areas Act, 16 U.S.C. 1221 et seq.

Compliance: Not applicable; this report is not being submitted to Congress.

7. Federal Water Project Recreation Act, as amended, 16 U.S.C. 4601-12 et seq.

Compliance: Public Notice of the availability of this documentation to the National Park Service (NPS) and the Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

8. Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661 et seq.

Compliance: Coordination with the FWS, Massachusetts Natural Heritage Program, and Massachusetts Division of Fisheries and Wildlife signifies compliance with the Fish and Wildlife Coordination Act.

9. Land and Water Conservation Fund Act of 1965, as amended, 16 U.S.C. 4601-4 et seq.

Compliance: Public Notice of the availability of this report to the National Park Service (NPS) and the Office of Statewide Planning relative to the Federal and State comprehensive outdoor recreation plans signifies compliance with this Act.

10. Marine Protection, Research, and Sanctuaries Act of 1972, as amended, 33 U.S.C. 1401 et seq.

Compliance: Not Applicable; project does not involve the transportation nor disposal of dredged material in ocean waters pursuant to Sections 102 and 103 of the Act, respectively.

11. National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470 et seq.

Compliance: Coordination with the State Historic Preservation Office determined that no historic or archaeological resources would be affected by the proposed project.

12. National Environmental Policy Act of 1969, as amended, 42 U.S.C. 4321 et seq.

Compliance: Preparation of this report signifies partial compliance with NEPA. Full compliance shall be attained at the time the Finding of No Significant Impact is signed.

13. Rivers and Harbors Act of 1899, as amended, 33 U.S.C. 401 et seq.

Compliance: No requirements for Corps' projects or programs authorized by Congress.

14. Watershed Protection and Flood Prevention Act, as amended, 16 U.S.C. 1001 et seq.

Compliance: Not Applicable

15. Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271 et seq.

Compliance: Not Applicable; project is not located within a designated wild or scenic river area.

Executive Orders

1. Executive Order 11988, Floodplain Management, 24 May 1977 amended by Executive Order 12148, 20 July 1979.

Compliance: Circulation of this report for public review fulfills the requirements of Executive Order 11988, Section 2(a)(2).

2. Executive Order 11990, Protection of Wetlands, 24 May 1977.

Compliance: Circulation of this report for public review fulfills the requirements of Executive Order 11990, Section 2 (b).

3. Executive Order 12114, Environmental Effects Abroad of Major Federal Actions, 4 January 1979.

Compliance: Not Applicable; project is located within the United States.

Executive Memorandum

1. Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing NEPA, 11 August 1980.

Compliance: Not Applicable; project does not involve nor impact agricultural lands.

TABLE 1:

Identified species of vegetation during site visits of 15 June and 1 March 1989. Sources: U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service.

<u>COMMON NAME</u>	<u>GENUS AND SPECIES</u>
silver maple	<u>Acer saccharinum</u>
red maple	<u>Acer rubrum</u>
boxelder	<u>Acer negundo</u>
eastern cottonwood	<u>Populus deltoides</u>
sycamore	<u>Plantanus occidentalis</u>
big-toothed aspen	<u>Populus grandidentata</u>
staghorn sumac	<u>Thus typhina</u>
black willow	<u>Salix nigra</u>
sugar maple	<u>Acer saccharum</u>
red oak	<u>Quercus rubra</u>
honey locust	<u>Gleditsia tricanthos</u>
gray birch	<u>Betula populifolia</u>
paper birch	<u>Betula papyrifera</u>
speckled alder	<u>Alnus rugosa</u>
white pine	<u>Pinus strobus</u>
cherry	<u>Prunus sp.</u>
red-oiser dogwood	<u>Cornus stolonifera</u>
elderberry	<u>Sambucus canadensis</u>
Japanese knotweed	<u>Polygonum cuspidatum</u>
reed canary grass	<u>Phalaris arundinacea</u>
smartweed	<u>Polygonum sp.</u>
evening primrose	<u>Oenothera biennis</u>
golden rod	<u>Solidago sp.</u>
American hornbeam	<u>Carpinus caroliniana</u>

TABLE 2:

Identified species of wildlife during site visits of 15 June and 1 March 1989. Sources: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and Nashua Watershed Association.

BIRDS

<u>Common Name</u>	<u>Scientific Name</u>
mourning dove	<u>Zenaidura macroura</u>
American goldfinch	<u>Spinus tristis</u>
American robin	<u>Turdus migratorius</u>
black-capped chickadee	<u>Parus atricapillus</u>
bank swallow	<u>Riparia riparia</u>
tree swallow	<u>Iridoprocne bicolor</u>
common flicker	<u>Colaptes auratus</u>
common crow	<u>Corvus brachyrhynchos</u>
belted kingfisher	<u>Ceryle alcyon</u>
spotted sandpiper	<u>Actitis macularia</u>
great blue heron	<u>Ardea herodias</u>
*Red-tailed hawks	<u>Buteo jamaicensis</u>

MAMMALS

eastern cottontail	<u>Sylvilagus floridanus</u>
gray squirrel	<u>Sciurus carolinensis</u>
beaver (signs)	<u>Castor canadensis</u>
muskrat (signs)	<u>Ondatra zibethicus</u>

HERPILES

Common garter snake	<u>Thamnophis sirtalis</u>
---------------------	----------------------------

*A nesting pair of Red-tailed hawks were observed adjacent to the project location. The habitat range of the species is inclusive to the project area.

TABLE 3:

A partial list of wildlife species most likely to exist within the project area and adjacent riparian corridor.

<u>Common Name</u>	<u>Scientific Name</u>
<u>WATERFOWL</u>	
mallard	<u>Anas platyrhynchos</u>
black duck	<u>Anas rubripes</u>
<u>BIRDS</u>	
green heron	<u>Butorides virescens</u>
American kestrel	<u>Falco sparverius</u>
killdeer	<u>Charadrius vociferous</u>
American woodcock	<u>Scolopax minor</u>
screech owl	<u>Otus asio</u>
belted kingfisher	<u>Ceryle alcyon</u>
hairy woodpecker	<u>Picoides villosus</u>
downy woodpecker	<u>Picoides pubescens</u>
eastern kingbird	<u>Tyrannus tyrannus</u>
eastern phoebe	<u>Sayornis phoebe</u>
rough-winged swallow	<u>Stelgidopteryx ruficollis</u>
blue jay	<u>Cyanocitta cristata</u>
American crow	<u>Corvus brachyrhynchos</u>
house wren	<u>Troglodytes aedon</u>
mockingbird	<u>Mimus polyglottos</u>
gray catbird	<u>Dumetella carolinensis</u>
brown thrasher	<u>Toxostoma rufum</u>
wood thrush	<u>Hylocichla mustelina</u>
veery	<u>Catharus fuscescens</u>
cedar waxing	<u>Bombycilla cedrorum</u>
European starling	<u>Sturnus vulgaris</u>
red-eyed vireo	<u>Vireo olivaceus</u>
warbling vireo	<u>Vireo gilvus</u>
yellow warbler	<u>Dendroica petechia</u>
common yellowthroat	<u>Geothlypis trichas</u>
red-winged blackbird	<u>Agelaius phoeniceus</u>
northern oriole	<u>Icterus galbula</u>
common grackle	<u>Quiscalus quiscula</u>
brown-headed cowbird	<u>Molothrus ater</u>
scarlet tanager	<u>Piranga olivacea</u>
rose-breasted grosbeak	<u>Pheucticus ludovicianus</u>
indigo bunting	<u>Passerina cyanea</u>
rufous-sided towhee	<u>Pipilo erythrophthalmus</u>
song sparrow	<u>Melospinza melodia</u>

TABLE 3 (Continued):

<u>Common Name</u>	<u>Scientific Name</u>
<u>MAMMALS</u>	
woodchuck	<u>Marmota monax</u>
eastern chipmunk	<u>Tamias striatus</u>
white-footed mouse	<u>Peromyscus leucopus</u>
muskrat	<u>Ondatra zibethicus</u>
Norway rat	<u>Rattus norvegicus</u>
opossum	<u>Didelphis marsupialis</u>
raccoon	<u>Procyon lotor</u>
striped skunk	<u>Mephitis mephitis</u>
eastern cottontail	<u>Sylvilagus floridanus</u>
river otter	<u>Lutra canadensis</u>

IX. APPENDIX

NEW ENGLAND DIVISION
U.S. ARMY CORPS OF ENGINEERS, WALTHAM, MA

PROJECT: LEOMINSTER, MA, EMERGENCY STREAMBANK PROTECTION

Evaluation of Section 404(b)(1) Guidelines

1. Review of Compliance (Section 230.10(a)-(d)).

- a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for EA alternative);
- ☒ ☐
YES NO
- b. The activity does not appear to:
- 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed threatened and endangered species or their critical habitat; and 3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);
- ☒ ☐
YES NO
- c. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values (if no, see section 2);
- ☒ ☐
YES NO
- d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).
- ☒ ☐
YES NO

2. Technical Evaluation Factors (Subparts C-F).

N/A Not
Signif- Signif-
icant icant*

a. Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).

- 1) Substrate.
- 2) Suspended particulates/turbidity.
- 3) Water.
- 4) Current patterns and water circulation.
- 5) Normal water fluctuations.
- 6) Salinity gradients.

	X	
	X	
	X	
	X	
X		
X		

b. Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D).

- 1) Threatened and endangered species.
- 2) Fish, crustaceans, mollusks and other aquatic organisms in the food web.
- 3) Other wildlife.

X		
	X	
	X	

c. Potential Impacts on Special Aquatic Sites (Subpart E).

- 1) Sanctuaries and refuges.
- 2) Wetlands.
- 3) Mud flats.
- 4) Vegetated shallows.
- 5) Coral reefs.
- 6) Riffle and pool complexes.

X		
	X	
X		
X		
X		
	X	

d. Potential Effects on Human Use Characteristics (Subpart F).

- 1) Municipal and private water supplies.
- 2) Recreational and Commercial fisheries.
- 3) Water-related recreation.
- 4) Aesthetics.
- 5) Parks, national and historic monuments, national seashores, wilderness areas, research sites, and similar preserves.

X		
	X	
	X	
	X	
X		

3. Evaluation and Testing (Subpart G).

- a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material. (Check only those appropriate.)

- 1) Physical characteristics.....☒
- 2) Hydrography in relation to
known or anticipated
sources of contaminants.....☒
- 3) Results from previous
testing of the material or
similar material in the
vicinity of the project.....☐
- 4) Known, significant sources
of persistent pesticides
from land runoff or
percolation.....☐
- 5) Spill records for petroleum
products or designated hazardous
substances (Section 311 of CWA).....☐
- 6) Public records of significant
introduction of contaminants from
industries, municipalities, or other sources.....☐
- 7) Known existence of substantial
material deposits of substances
which could be released in harmful
quantities to the aquatic environment
by man-induced discharge activities.....☒
- 8) Other sources (specify).....☐

List appropriate references.

See Environmental
Assessment _____

- b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or that levels of contaminants are substantively similar at extraction and disposal sites and not likely to require constraints. The material meets the testing exclusion criteria.

☒
YES

☐
NO

4. Disposal Site Delineation (Section 230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

- | | |
|--|-------------------------------------|
| 1) Depth of water at disposal site..... | <input checked="" type="checkbox"/> |
| 2) Current velocity, direction, and
variability at disposal site..... | <input checked="" type="checkbox"/> |
| 3) Degree of turbulence..... | <input type="checkbox"/> |
| 4) Water column stratification..... | <input type="checkbox"/> |
| 5) Discharge vessel speed and
direction..... | <input type="checkbox"/> |
| 6) Rate of discharge..... | <input type="checkbox"/> |
| 7) Dredged material characteristics
(constituents, amount, and type
of material, settling velocities)..... | <input type="checkbox"/> |
| 8) Number of discharges per unit of
time..... | <input type="checkbox"/> |
| 9) Other factors affecting rates and
patterns of mixing (specify)..... | <input type="checkbox"/> |

List appropriate references.

See Environmental
Assessment _____

b. An evaluation of the appropriate factors in
4a above indicates that the disposal site
and/or size of mixing zone are acceptable.....

<input checked="" type="checkbox"/>	<input type="checkbox"/>
YES	NO

5. Actions To Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken,
through application of recommendation of Section
230.70-230.77 to ensure minimal adverse effects of
the proposed discharge.....

<input checked="" type="checkbox"/>	<input type="checkbox"/>
YES	NO

6. Factual Determination (Section 230.11).

A review of appropriate information as identified in items 2 - 5 above indicates that there is minimal potential for short or long term environmental effects of the proposed discharge as related to:

- a. Physical substrate
(review sections 2a, 3, 4, and 5 above). YES ☒ NO ☐
- b. Water circulation, fluctuation and salinity
(review sections 2a, 3, 4, and 5). YES ☒ NO ☐
- c. Suspended particulates/turbidity
(review sections 2a, 3, 4, and 5). YES ☒ NO ☐
- d. Contaminant availability
(review sections 2a, 3, and 4). YES ☒ NO ☐
- e. Aquatic ecosystem structure, function
and organisms (review sections 2b and
c, 3, and 5) YES ☒ NO ☐
- f. Proposed disposal site
(review sections 2, 4, and 5). YES ☒ NO ☐
- g. Cumulative effects on the aquatic
ecosystem. YES ☒ NO ☐
- h. Secondary effects on the aquatic
ecosystem. YES ☒ NO ☐

7. Findings of Compliance or non-compliance.

- a. The proposed disposal site for discharge of dredged
or fill material complies with the Section 404(b) (1)
guidelines..... ☒

DATE

DANIEL M. WILSON
Colonel, Corps of Engineers
Division Engineer

Finding of No Significant Impact

The proposed plan involves the construction of approximately 400 feet of stone revetment along the North Nashua River in Leominster, Massachusetts. At present, bank erosion is threatening the Leominster Connector (a public road).

No significant adverse impacts to the environment are anticipated. The major impact of this project is the permanent relocation of a section of the North Nashua River. The project area is located in a forested floodplain and has enough room to accommodate a minor channel shift. Loss of approximately 0.5 to 0.75 acres of wildlife habitat is expected. Losses to vegetation will be compensated for in part by planting grasses, herbs, and low growing shrubs and bushes on the upper bank of the revetment and in areas disturbed by construction. This will provide a buffer zone between the road and riparian corridor as well. My determination of a Finding of No Significant Impact is based on the Environmental Assessment and the following considerations.

a. Construction will result in a localized, short term increase in suspended solid load in the North Nashua River. Sediment loading would be minimized by employing standard erosion control techniques and by scheduling the construction during the seasonal low flow period.

b. The project will destroy the existing nearshore aquatic habitat and community along approximately 400 feet of riverbank. The stone base of the revetment will, however, provide a suitable substrate for the reestablishment of a productive aquatic invertebrate community.

c. Although localized changes in fish community structure may occur, the project should have no significant adverse impact on adult fish or fish eggs and larvae in the North Nashua River at Leominster.

d. This project will have no anticipated impact on any State or Federal rare or endangered species.

e. No archaeological or historical resources will be affected by this project.

Based on my review and evaluation of the environmental effects as presented in the Environmental Assessment, I have determined that the Leominster Section 14 Emergency Streambank

Protection Project is not a major Federal action significantly affecting the quality of the human environment. Therefore I have determined that this project is exempt from requirements to prepare an Environmental Impact Statement.

Date

Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF

August 25, 1989

Planning Division
Impact Analysis Branch

RECEIVED
AUG 31 1989
MASS. HIST. COMM.

Ms. Valerie Talmage - Executive Director
Massachusetts Historic Commission
80 Boylston Street
Boston, MA 02116

Dear Ms. Talmage:

The Army Corps of Engineers is preparing an environmental assessment of a proposed emergency streambank protection project designed to stabilize a section of riverbank along the North Nashua River in Leominster, Massachusetts (Figure 1). Streambank erosion is threatening the Leominster Connector (a state road) and if not stabilized will undermine the road and result in its loss (Photographs enclosed). We would like your comments on the proposed project.

Project plans call for the construction of a stone revetment with a one foot vertical to two feet horizontal slope along 400 feet of riverbank. The revetment will extend from the river channel up to the Leominster Connector. It will consist of compacted granular fill overlain with six inches of crushed stone on the upper bank and 12 inches of gravel bedding overlain with 24 inches of stone protection on the lower bank. Permanent relocation of the river channel will be required. Excavation of the new channel will start at the downstream end of the project on the northern streambank. Excavated material will be used to breach the present North Nashua River at the upstream end on the southern riverbank. Approximately 5,000-7,000 cubic yards of granular fill, 1200 of which will be placed in the present river channel, will be required to construct the project. The stone revetment will extend from approximately five feet near the ends to 40 feet at the midpoint into the river channel.

CONCURRENCE: *Brona Simon Dwyer*

Sept. 7, 1989

for

VALERIE A. TALMAGE
EXECUTIVE DIRECTOR
MASSACHUSETTS
HISTORICAL COMMISSION

A temporary access road has been constructed parallel to the Leominster Connector upstream of the project. The Massachusetts Department of Public Works (DPW) has already constructed this access road as part of the temporary emergency stabilization procedures they have developed at this site. The area of erosion (see enclosed photographs) has been graded and gravel fill has been placed from the edge of the roadway to a concrete block wall that has been erected along the water's edge.

This area was studied as part of a project in 1977 which involved relocation of a portion of the North Nashua River due to the construction of a highway interchange between Interstate I-190, which was currently under construction and Rte. 2, and relocation of Nashua Street (Figure 2) (North Nashua River Relocation Study for Construction I-190, Leominster, Massachusetts. Wildlife Habitat and Impact Assessment. Prepared by Universal Engineering Corporation, Boston, 1977.). The interchange is known as the Leominster Connector. The area presently being considered is directly upstream of the relocated channel. Since 1977, the southern streambank in this area has undergone severe erosion and as much as ten feet of the bank has washed away. The current streambank abuts the fill for the Leominster Connector (Figure 3). This area has no archaeological potential. In addition to the effects of erosion, the southern streambank has been modified by construction of the highway and the temporary fill and concrete wall which has been erected by the DPW. Therefore, any sites which may have been present would have been disturbed or destroyed by the combined effects of all of these activities.

The northern streambank was also studied as it was included in the right-of-way for the highway project. According to the report, this area was referred to as the Stripped Flood Plain. "This area has been stripped of topsoil, and it consists of a sparsely vegetated and highly eroded terrain. During flood periods the water inundates this area, and the river assumes a straight flow across the flood plain" (see Figures 4, 5, and 6). "The topsoil was removed from this area approximately ten years ago and used for agriculture. Floodwaters have removed fine particles from the remaining subsoil and left a rolling sand and gravel terrain" (p. A-27). Mitigation measures for the northern streambank created a wetland habitat by excavating sand and gravel deposits and stabilizing the riparian habitat. Any archaeological sites which may have been present would have been destroyed by these land modifications.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
400 RALPH PILL MARKETPLACE
22 BRIDGE STREET
CONCORD, NEW HAMPSHIRE 03301-4901

Joseph L. Ignazio
Chief, Planning Division
Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Mass 02254

June 22, 1989

Dear Mr. Ignazio:

This is in response to your letter of May 17, 1989, requesting our comments on the proposed Section 14 emergency streambank protection project on the North Nashua River in Leominster, Massachusetts. We provided information on threatened and endangered species in the project area in our letter of June 7, 1989. The following comments are provided pursuant to the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661 et seq.)

Two streambank protection alternatives are being considered for the 400-500 foot section of eroding streambank. One involves construction of a stone revetment that would encroach up to 40 feet into the river channel. The other is a gabion wall that would encroach up to 10 feet into the channel.

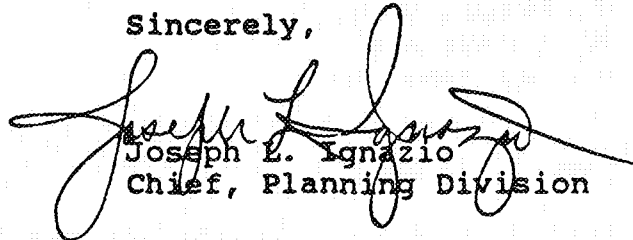
With the exception of exposed soils at the erosion site, the river banks support a variety of vegetation types that provide cover for fish and wildlife. Willow, aspen, birch and sumac are some of the more common species adjacent to the erosion site. Other species in the vicinity include red-osier dogwood, box elder, red maple, Japanese knotweed, reed canary grass, and smartweed.

The Massachusetts Department of Fisheries and Wildlife reports there is a warmwater fishery in the river segment affected by the project. Species include bass, pickerel, fallfish, suckers, and bullhead. Substrate in the river bed is mixed gravel and sand. The river corridor provides habitat for a variety of wildlife including reptiles and amphibians, small mammals, white-tailed deer, and birds. Among the species seen during our June 15, 1989, site inspection were: cottontail, grey squirrel, bank swallow, spotted sandpiper, great blue heron and kingfisher. Bank swallow nest burrows were visible in the eroding river bank at the project site.

Of the two protection alternatives proposed, both would have similar impacts to the riverbank, while the gabion structure would result in less disturbance to the river channel. The minor channel realignment associated with the revetment should not cause significant habitat impacts since there is sufficient area within the floodplain to accommodate a minor channel shift.

We feel, therefore, that the proposed emergency streambank protection project is unlikely to have an effect upon any structure or site of historic, architectural or archaeological significance as defined by the Natural Historic Preservation Act of 1966, as amended. We would appreciate your concurrence. If you have any questions, feel free to contact Ms. Kate Atwood, of my staff, at (617)-647-8796.

Sincerely,



Joseph E. Ignazio
Chief, Planning Division

Enclosure



United States Department of the Interior

FISH AND WILDLIFE SERVICE
400 RALPH PILL MARKETPLACE
22 BRIDGE STREET
CONCORD, NEW HAMPSHIRE 03301-4901

Joseph Ignazio, Chief
Planning Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

June 7, 1989

ATTN: Impact Analysis Branch

Dear Mr. Ignazio:

This responds to your letter dated May 17, 1989, for information on the presence of Federally listed and proposed endangered or threatened species in accordance with your proposed Section 14 Emergency Streambank Protection Project in Leominster, Massachusetts.

No Federally listed or proposed threatened and endangered species under our jurisdiction are known to occur within the immediate area of the project, with the exception of occasional transient individuals. However, several populations of the small whorled pogonia (Isotria medeoloides) have been documented in Worcester County. We recommend that you contact Jay Copeland of the Massachusetts Natural Heritage Program, 100 Cambridge Street, Boston, Massachusetts 02202, at 617-727-9194, for further information on the small whorled pogonia and state listed species. Your letter did not provide us with sufficient information to determine whether the proposed project area is suitable habitat likely to have a population of small whorled pogonia. We recommend that you survey the area if the habitat is somewhat open mixed hardwood forest (beech, birch and maple) or mixed deciduous forest (beech, oak, and hemlock). Jay Copeland should be able to assist you. Should the small whorled pogonia be found on the project site, you will need to contact our office for further consultation. If not, no Biological Assessment or further consultation is required with us under Section 7 of the Endangered Species Act. Should project plans change, or additional information on listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to endangered species under our jurisdiction. It does not address other legislation or our responsibilities under the Fish and Wildlife Coordination Act.

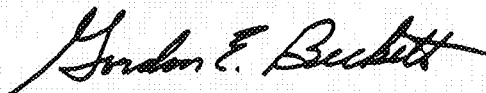
Our primary concerns with the proposed project are avoidance of downstream water quality and aquatic habitat impacts from construction, and restoration/enhancement of the site following construction through vegetative plantings. Your letter indicated that the proposed work would be performed during the low flow period and that the work site would be dewatered by a cofferdam. Impacts to downstream water quality should be minimized through the use of best management practices such as silt fencing, sediment traps, and care during the placement and removal of temporary fill.

We recommend that following construction, all disturbed areas be seeded and mulched to prevent surficial erosion. In addition to planting grasses/clover to control erosion, we recommend that low growing shrubs such as willow or dogwood be planted on the bank to provide shade and cover. Reestablishment of tree and shrub cover on the upper portion of the bank is important to provide a buffer between the river corridor and adjacent roadway. We also recommend backfilling with topsoil that portion of stone armoring not subject to flooding, and planting vegetative ground cover. Restoration and revegetation of the temporary access road should also be performed following construction.

A final concern involves the loss of bank swallow nests at the project site. Since the taking of migratory birds, eggs, or nests is prohibited under the Migratory Bird Treaty Act (16 U.S.C. 703-711), project construction must be scheduled to avoid the nesting period. Bank swallows usually return to New England beginning in mid-April and begin nest construction by the first week of May. We would expect young of the year to be fledged by the end of July. Construction at the bank erosion site should therefore be scheduled to occur between August 1 and April 30 to avoid the nesting period.

We appreciate the opportunity to comment on this project. Please contact Mike Tehan at (603) 225-1411 if there are any questions.

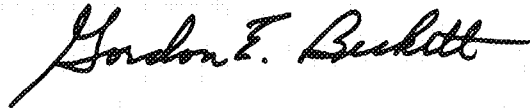
Sincerely yours,

A handwritten signature in cursive script, reading "Gordon E. Beckett".

Gordon E. Beckett
Supervisor
New England Area

A list of Federally designated endangered and threatened species in Massachusetts is inclosed for your information. Thank you for your cooperation and please contact Susi von Oettingen of this office at 603-225-1411 if we can be of further assistance.

Sincerely yours,

A handwritten signature in cursive script that reads "Gordon E. Beckett". The signature is written in dark ink and is positioned to the right of the typed name.

Gordon E. Beckett
Supervisor
New England Area

Inclosure

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS

Common Name	Scientific Name	Status	Distribution
FISHES:			
Sturgeon, shortnose*	<u>Acipenser brevirostrum</u>	E	Connecticut River & Atlantic Coastal Waters
REPTILES:			
Turtle, green*	<u>Chelonia mydas</u>	T	Oceanic straggler in Southern New England
Turtle, hawksbill*	<u>Eretmochelys imbricata</u>	E	Oceanic straggler in Southern New England
Turtle, leatherback*	<u>Dermochelys coriacea</u>	E	Oceanic summer resident
Turtle, loggerhead*	<u>Caretta caretta</u>	T	Oceanic summer resident
Turtle, Atlantic ridley*	<u>Lepidochelys kempi</u>	E	Oceanic summer resident
Turtle, Plymouth red- bellied	<u>Chrysemys rubriventris bangsi</u>	E	Plymouth & Dukes Counties
BIRDS:			
Eagle, bald	<u>Haliaeetus leucocephalus</u>	E	Entire state
Falcon, American peregrine	<u>Falco peregrinus anatum</u>	E	Entire state-reestablish- ment to former breeding range in progress
Falcon, Arctic peregrine	<u>Falco peregrinus tundrius</u>	E	Entire state migratory-no nesting
Plover, Piping	<u>Charadrius melodus</u>	T	Atlantic coast
Roseate Tern	<u>Sterna dougallii dougallii</u>	E	Atlantic Coast
MAMMALS:			
Cougar, eastern	<u>Felis concolor cougar</u>	E	Entire state-may be extinct
Whale, blue*	<u>Balaenoptera musculus</u>	E	Oceanic
Whale, finback*	<u>Balaenoptera physalus</u>	E	Oceanic
Whale, humpback*	<u>Megaptera novaeangliae</u>	E	Oceanic
Whale, right*	<u>Eubalaena spp. (all species)</u>	E	Oceanic
Whale, sei*	<u>Balaenoptera borealis</u>	E	Oceanic
Whale, sperm*	<u>Physeter catodon</u>	E	Oceanic
MOLLUSKS: NONE			
PLANTS:			
Small Whorled Pogonia	<u>Isotria medeoloides</u>	E	Hampshire, Essex Hampden, Worcester Middlesex Counties
Gerardia, Sandplain	<u>Agalinus acuta</u>	E	Barnstable County

* Except for sea turtle nesting habitat, principal responsibility for these species is vested with the National Marine Fisheries Service



May 26, 1989

Planning Division
Impact Analysis Branch
Department of the ARMY
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

RE: Leominster, MA; Streambank Protection Project.

Dear Sir or Madam:

Thank you for contacting the Natural Heritage and Endangered Species Program for assistance in completing sections III.C.1 and III.C.2 of the Environmental Notification Form concerning the potential adverse ecological effects of the above project. Based on our review of the project, we recommend the following responses be included in the E.N.F.

III.C.1.: At this time, the Natural Heritage and Endangered Species Program is not aware of any rare or endangered species of animal which may be significantly affected by the project.

III.C.2. At this time, the Natural Heritage and Endangered Species Program is not aware of any rare or endangered species of plant or any ecologically significant natural plant community which may be significantly affected by the project.

Please note that the Natural Heritage and Endangered Species Program does not routinely maintain occurrence or inventory records for fisheries, wildlife, or vegetation that are not rare or endangered. Therefore the above responses may not be sufficient to complete the E.N.F. The project may significantly affect fisheries, wildlife, or vegetation that are not rare or endangered if the project will alter currently undeveloped lands, wetlands, waterways, or other areas that support these resources.

If your project plans change, or if additional inventory and research results in an update of our database, this evaluation may require reconsideration. Please contact me if you have any questions.

Sincerely,

Jay Copeland
fw Jay Copeland
Environmental Reviewer

JC/jc

cc: town file, chrono file

May 17, 1989

Planning Division
Impact Analysis Branch

Mr. Gordon E. Beckett, Supervisor
U.S. Department of the Interior
Fish and Wildlife Service
Ecological Services
22 Bridge Street, Ralph Pill Bldg., 4th Floor
Concord, New Hampshire 03301

Dear Mr. Beckett:

We are proposing to conduct a Section 14 , Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. The purpose of this letter is to request your comments on the proposed project, pursuant to the Fish and Wildlife Coordination Act of 1958, as amended. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

There are two alternatives proposed for the stabilization of the riverbank. Alternative 1 involves the placement of 400-500 linear feet of stone revetment (see enclosed sketch no.6). The stone revetment would encroach the existing river channel approximately 0-40 feet (0 feet at the upstream and downstream areas of the work site, and 40 feet towards the middle of the work site). A temporary channel would be constructed (by use of a cofferdam) while the work is being performed in order to divert the water away from the work site. A temporary access road would be constructed parallel to the Leominster Connector upstream of the proposed project.

-2-

Alternative 2 involves the placement of approximately 450 linear feet of gabion wall (see enclosed sketch no.7) along the riverbank. The gabion wall would encroach the river channel approximately 0-10 feet. Approximately 450 cubic yards of the existing channel would be excavated in order to place the gabion wall.

Construction is projected to occur during the summer of 1990 (low flow period). Proper erosion control measures (i.e. silt fencing) would be implemented throughout construction. The work is expected to take about 3 months to complete.

Ms. Kerrin Dame, of the Impact Analysis Branch, and Mr. David Larsen, the project manager, will be conducting a coordinated on-site meeting with interested natural resource agencies on Thursday June 1, 1989 at 10:00 AM. The purpose of this meeting is to explain the proposed project and to elicit agency concerns and suggestions. Your agency's participation at this meeting would be appreciated.

If you require any further information please contact Ms. Kerrin Dame of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

cc:

✓ Ms. Dame
Mr. Larsen
Mr. Hubbard
Mr. Pronovost
IAB Files
Plng. Div. Files
Reading File

May 17, 1989

Planning Division
Impact Analysis Branch

Mr. Douglas A. Thompson
Chief, Wetlands Protection Section
U.S. Environmental Protection Agency
Region 1
J.F.K. Federal Building
Boston, Massachusetts 02203

Dear Mr. Thompson:

We are proposing to conduct a Section 14 , Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. The purpose of this letter is to request your comments on the proposed project. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

There are two alternatives proposed for the stabilization of the riverbank. Alternative 1 involves the placement of 400-500 linear feet of stone revetment (see enclosed sketch no.6). The stone revetment would encroach the existing river channel approximately 0-40 feet (0 feet at the upstream and downstream areas of the work site, and 40 feet towards the middle of the work site). A temporary channel would be constructed (by use of a cofferdam) while the work is being performed in order to divert the water away from the work site. A temporary access road would be constructed parallel to the Leominster Connector upstream of the proposed project.

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Alternative 2 involves the placement of approximately 450 linear feet of gabion wall (see enclosed sketch no.7) along the riverbank. The gabion wall would encroach the river channel approximately 0-10 feet. Approximately 450 cubic yards of the existing channel would be excavated in order to place the gabion wall.

Construction is projected to occur during the summer of 1990 (low flow period). Proper erosion control measures (i.e. silt fencing) would be implemented throughout construction. The work is expected to take about 3 months to complete.

Ms. Kerrin Dame, of the Impact Analysis Branch; and Mr. David Larsen, the project manager, will be conducting a coordinated on-site meeting with interested natural resource agencies on Thursday, June 1, 1989 at 10:00 AM. The purpose of this meeting is to explain the proposed project and to elicit agency concerns and suggestions. Your agency's participation at this meeting would be appreciated.

If you require any further information please contact Ms. Kerrin Dame of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

cc:
✓ Ms. Dame
Mr. Larsen
Mr. Hubbard
Mr. Pronovost
IAB Files
Plng Div File
Reading File

May 17, 1989

Planning Division
Impact Analysis Branch

Mr. Jay Copeland
Massachusetts Natural Heritage Program
Division of Fish and Wildlife
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. Copeland:

We are proposing to conduct a Section 14 , Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. The purpose of this letter is to request a list of State endangered and threatened species for the project area, pursuant to the Fish and Wildlife Coordination Act, as amended. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

There are two alternatives proposed for the stabilization of the riverbank. Alternative 1 involves the placement of 400-500 linear feet of stone revetment (see enclosed sketch no.6). The stone revetment would encroach the existing river channel approximately 0-40 feet (0 feet at the upstream and downstream areas of the work site, and 40 feet towards the middle of the work site). A temporary channel would be constructed (by use of a cofferdam) while the work is being performed in order to divert the water away from the work site. A temporary access road would be constructed parallel to the Leominster Connector upstream of the proposed project.

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If you require any further information please contact Ms. Kerrin Dame of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

cc:

MS. Dame
Mr. Larsen
Mr. Hubbard
Mr. Pronovost
IAB Files
Plng Div File
Reading File

May 17, 1989

Planning Division
Impact Analysis Branch

Mr. Wayne MacCallum, Director
Division of Fisheries and Wildlife
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. MacCallum:

We are proposing to conduct a Section 14 , Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. The purpose of this letter is to request your comments on the proposed project. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

There are two alternatives proposed for the stabilization of the riverbank. Alternative 1 involves the placement of 400-500 linear feet of stone revetment (see enclosed sketch no.6). The stone revetment would encroach the existing river channel approximately 0-40 feet (0 feet at the upstream and downstream areas of the work site, and 40 feet towards the middle of the work site). A temporary channel would be constructed (by use of a cofferdam) while the work is being performed in order to divert the water away from the work site. A temporary access road would be constructed parallel to the Leominster Connector upstream of the proposed project.

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Ms. Kerrin Dame, of the Impact Analysis Branch, and Mr. David Larsen, the project manager, will be conducting a coordinated on-site meeting with interested natural resource agencies on Thursday, June 1, 1989 at 10:00 AM. The purpose of this meeting is to explain the proposed project and to elicit agency concerns and suggestions. Your agency's participation at this meeting would be appreciated.

If you require any further information please contact Ms. Kerrin Dame of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

cf: Mr. Richard Horgan
Department of Public Works
10 Park Plaza, 6th Floor
Boston, Massachusetts 02116

cc:

Ms. Dame
Mr. Larsen
Mr. Hubbard
Mr. Pronovost
IAB Files
Plng Div File
Reading File

May 17, 1989

Planning Division
Impact Analysis Branch

Mr. Daniel Greenbaum, Commissioner
Department of Environmental Quality Engineering
One Winter Street
Boston, Massachusetts 02129

Dear Mr. Greenbaum:

The purpose of this letter is to inform your office that the Corps of Engineers, New England Division, is proposing to conduct a Section 14 , Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

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If you require any further information please contact Ms. Kerrin Dame of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

cf: Mr. Cornelius O'Leary, Acting Director
Division of Water Pollution Control
Department of Environmental Quality Engineering
One Winter Street
Boston, Massachusetts 02108

cc:

✓ Ms. Dame
Mr. Larsen
Mr. Hubbard
Mr. Pronovost
IAB Files
Plng Div File
Reading File

May 18, 1989

Planning Division
Impact Analysis Branch

Mr. John P. DeVillars, Secretary
Executive Office of Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02202

Dear Mr. DeVillars:

The purpose of this letter is to inform your office that the Corps of Engineers, New England Division, is proposing to conduct a Section 14, Emergency Streambank Protection Project, along a section of the North Nashua River in Leominster, Massachusetts. An Environmental Assessment for the proposed work is currently being prepared. A Water Quality Certificate and 404(b)(1) Evaluation will also be required for the proposed work. A location map and the proposed design plan alternatives are enclosed to aid you in your work.

Significant riverbank erosion is occurring along approximately 400 feet of the North Nashua River, threatening the Leominster Connector. The erosion is being caused by high water velocities removing fine-grained soils from the bank.

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Construction is projected to occur during the summer of 1990 (low flow period). Proper erosion control measures (i.e. silt fencing) would be implemented throughout construction. The work is expected to take about 3 months to complete.

Ms. Kerrin Dane, of the Impact Analysis Branch, and Mr. David Larsen, the project manager, will be conducting a coordinated on-site meeting with interested natural resource agencies on Thursday, June 1, 1989 at 10:00 AM. The purpose of this meeting is to explain the proposed project and to elicit agency concerns and suggestions. Your agency's participation at this meeting would be appreciated.

If you require any further information please contact Ms. Kerrin Dane of the Impact Analysis Branch at (617) 647-8536.

Sincerely,

Enclosure

Joseph L. Ignazio
Chief, Planning Division

CC:
Ms. Dane-113M
Mr. Larsen-114M
Mr. Hubbard-113M
Mr. Pronovost-113M
IAB Files
Plng Div File
Reading File

APPENDIX A: ECONOMIC ANALYSIS

Rationale for Economic Analysis

Project benefits are based on preventable damages. Under the without project condition recurring costs for emergency slope repair, road repairs, emergency traffic controls, traffic detours, and post-construction monitoring would be experienced every 4 years. These costs are estimated to be \$179,000 as shown in Table A-1.

Benefit estimates reflect costs associated with rebuilding of the temporary work, as well as restoration of the roadway to service in the event of its failure.

TABLE A-1
DERIVATION OF BENEFITS
LEOMINSTER CONNECTOR
LEOMINSTER, MASSACHUSETTS

Preventable Damages Item	Estimated Temporary Repair Cost
Temporary Slope Repair	\$ 55,000
Road Repair	4,800
Emergency Traffic Control & Police Details	11,800
Traffic Detours	101,400
Post Construction Monitoring of Repair by Survey Crew	<u>6,000</u>
Total Preventable Damages	\$179,000

Annual Benefits

Temporary Slope Repair and Associated Cost
(based on a 4 year recurrence interval)

<u>Replacement Year</u>	<u>Cost</u>	<u>Present Worth LS</u>	<u>Capital Rec. Factor 25</u>	<u>Annual Cost</u>
4	\$179,000	.71168	.10077	\$12,837
8	"	.50649	"	9,136
12	"	.36046	"	6,502
16	"	.25653	"	4,627
20	"	.18257	"	3,293
24	"	.12993	"	<u>2,343</u>
				TOTAL
Benefit to Cost Ratio				SAY \$39,000

The first cost of the proposed project is itemized in Part III Section 2 (TABLE 3).

The total annual cost is given as \$23,800.

The benefit to cost ratio is \$39,000/\$23,800; approx. 1.6 to 1.

APPENDIX B: PUBLIC CORRESPONDENCE RECORD
(excluding those items that have appeared in the Environmental Assessment)

APPENDIX B - PUBLIC CORRESPONDENCE RECORD
(excluding those items that have appeared in Environmental Assessment)

CONTENTS:

- Item 1, Letter to Corps of Engineers from Leominster City Clerk's Office
dated 1-11-89
- Item 2, Letter to Massachusetts Department of Public Works from Corps of
Engineers dated 2-27-89
- Item 3, Letter to Corps of Engineers from Massachusetts Department of Public
Works dated 3-9-89
- Item 4, Letter to Corps of Engineers from Massachusetts Department of Public
Works dated 3-21-89
- Item 5, Letter to Massachusetts Department of Public Works from City of
Leominster dated 3-31-89
- Item 6, Letter to Corps of Engineers from Massachusetts Department of Public
Works dated 4-5-89
- Item 7, Letter to Massachusetts Department of Public Works from Corps of
Engineers dated 9-12-89
- Item 8, Letter to Corps of Engineers from Massachusetts Department of Public
Works dated 11-22-89
- Item 9, Letter to Corps of Engineers from Massachusetts Department of Public
Works dated 3-26-90



AUDREY J. JOHNSON

OFFICE OF CITY CLERK

25 WEST STREET
LEOMINSTER, MASS 01453

TELEPHONE
508-534-7536

January 11, 1989

Department of the Army
New England Director Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Sir:

At the regular meeting of the City Council, January 9, 1989, the following petition was referred to the Army Corps of Engineers for advice and guidance.

4-'89

Alfred R. Brassard, Ward 2 Councillor: Have a full investigation on the erosion of the Nashua River bank at the Leominster Connector and Nashua Street. It looks like we are losing about three feet a year. We should notify the State D.P.W., D.E.Q.E., Leominster D.P.W., Nashua River Watershed Association, City Property and Legal Affairs Committee, Building Inspector, Board of Health, City Solicitor John J. Curley, III, and the Army Corps of Engineers for advice and guidance.

The City Council would appreciate your help in resolving this problem.

Sincerely,

Audrey J. Johnson
City Clerk

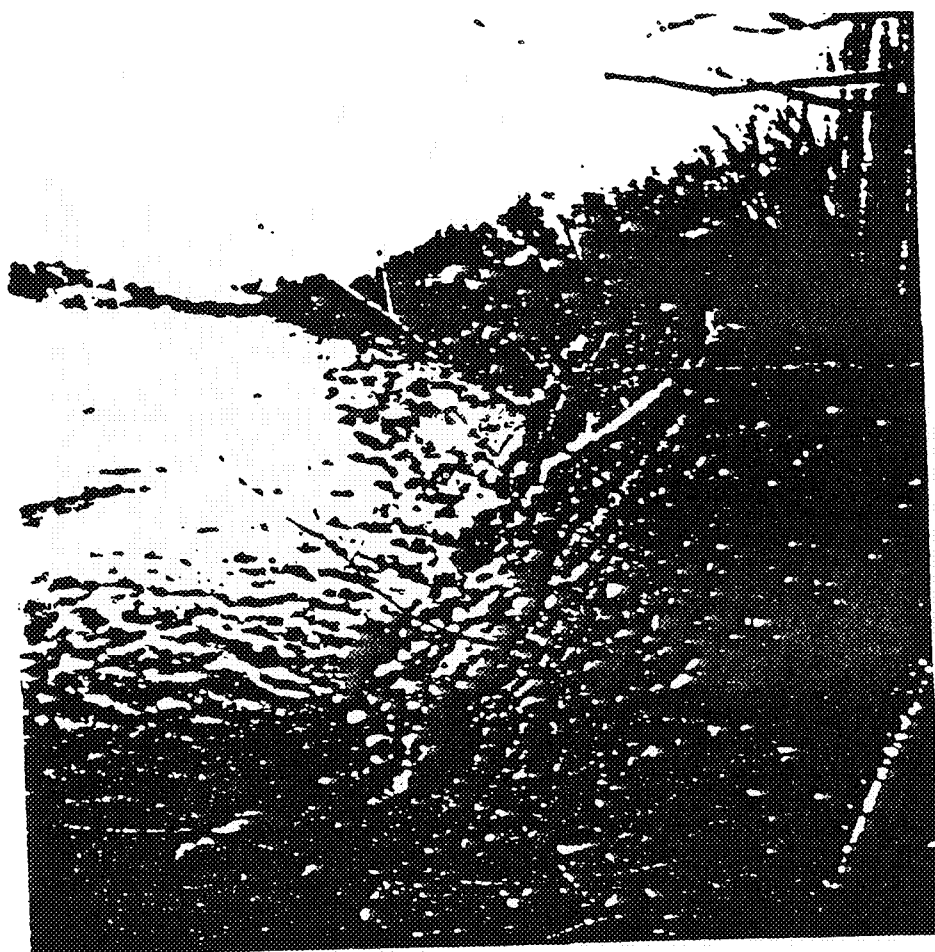
AJJ/bd



SAND BAR ON LEFT IS WHERE RIVER WAS IN APRIL '87.



LEOM. CONN. & NASHUA ST. RIVER & FENCE.



LEOM. CONN. & NASHUA ST. FENCE IS LOCATED 12' FROM ROAD.

February 27, 1989

Planning Division
Plan Formulation Branch

Ms. Ellen DiCeronimo
Associate Commissioner
Massachusetts Department of Public Works
10 Park Plaza
Boston, Massachusetts 02116

Dear Ms. DiCeronimo:

In response to a telephone request from Mr. John Piaseczny of your Department of Public Works staff, I have enclosed information relative to our recent inspection of erosion conditions along the Nashua River in Leominster, Massachusetts and a copy of our estimated implementation schedule.

The estimated schedule is based on a general time frame which could either be shorter or longer depending on factors such as unknown environmental considerations and identification of the legally empowered and financially capable local sponsor.

If you have further questions on this matter please contact Mr. David Larsen at (617)647-8113.

Sincerely,

Encls

Joseph L. Ignazio
Chief, Planning Division

CV: Mr. John Piaseczny
Mass. DPW - Room 6340
10 Park Plaza
Boston, MA 02116
Mr. David Larsen
Planning Div. Files
Reading Files

SCHEDULE FOR COMPLETION

SECTION 14 STUDY - LEOMINSTER, MA.

1. Initial Field Reconnaissance.....9 February 1989
2. Geotechnical Field Reconnaissance.....1 March 1989
3. Anticipated Completion of Design, Estimating & Economics.. May 1989
4. Completion of Environmental Coordination..... June 1989
5. Receipt of Letter of Intent for Non-Federal Cost Sharing.. July 1989
6. Submission of Reconnaissance Report to Washington..... August 1989
7. Approval of Report..... Sept. 1989
8. Initiate Plans & Specifications..... October 1989
9. Initiate Construction..... April 1990

REFERENCE OR OFFICE SYMBOL

SUBJECT

CEWED-PL-P

Trip Report: Meeting with local, City, State
officials - Leominster, MA

Commander
Thru: Channels

FROM
Francis C. Fung, PDS

DATE
14 February 1989
Fung/pam/7381

CMT 1

1. Date of Trip: February 9, 1989
2. Sponsored by: City of Leominster, MA
3. Principal Participants: Audrey Johnson - City Clerk
Wayne M. Doucet - City PW Director
John Calli - MDPW, Dist. 3
Ellen DiGeronimo - MDPW, Associate Commissioner
Joseph DiPrima - local resident
Rick Turner - local resident
F. William Swaine - NED
David Larsen - NED
Francis Fung - NED

4. Report: At the request of the Leominster city officials (letter dated January 11, 1989), we met with the local and State participants at the City Hall. Mr. Wayne M. Doucet, Director of Public Works, City of Leominster, explained to us that there is a serious erosion problem on the North Washua River along the slope adjacent to the Leominster Connector. Mr. John Calli from the Massachusetts Department of Public Works (MDPW) provided us a map (see attachment) which was prepared about 1985 to show the details and contour layout for the Leominster Connector and relocated Washua Street. We explained the Section 14 procedure, schedules and cost sharing requirements.

We then inspected the erosion site. The slope is above 1 to 1 in gradient and there are no erosion protection measures at all. Approximately 14 to 20 feet from the guard rail, soils are eroding rapidly. The eroded slope is about 400 feet long along North Washua River and 25-30 feet high (see attached photos). In general, a significant portion of the slope has now become exposed loose gravel. Mr. Doucet pointed out that visible erosion had begun soon after completion of the Leominster Connector construction (Circa 1981). If the erosion continues a portion of the highway may be undermined. There will be traffic flow problems in this area because the Leominster Connector is the major arterial to roadway Route 2, I-190 and the Searstown Mall.

State officials had met the previous day and determined that the road could remain open for now, but that some remedial action should take place in the near future. We recommended that the MDPW make a determination regarding the present condition of the slope. If an emergency condition is declared, we would recommend that the State make temporary repairs pending completion of the Federal project study.

We also met with residents of River Street in Leominster, Mr. Joseph DiPrima and Mr. Rick Turner who had concerns on erosion of their private properties. After the site inspection, we told them that there are no Federal programs or funds to assist them with protection of their private properties. However, we did advise them that we could provide technical advice and guidance in controlling their erosion problems. We subsequently sent them info on riverbank stabilization and the Corps permit process.

5. Import/Impact on NED: Erosion damage to the embankment near the Leominster Connector is critical enough to warrant further Corps study. We will determine if there is sufficient economic justification to protect the highway under the Section 14 authority. At the present time this location is a high priority item for the Mass DPW which may require State action before Corps construction can be recommended or funded.

Subsequent to the meeting, Mr. John Piaseczny of the Mass DPW called Mr. Swaine to request that a copy of this report and information regarding Corps implementation schedule be sent to Ms. DiGeronimo. We will do this and coordinate further findings with Mr. Piaseczny.

Francis C. Fung

Francis C. Fung
Project Development Section

Attachments

cc: Mr. Larsen
Mr. Swaine
Mr. Fung
Planning Div. Files

ELEVATION
NOT TO SCALE
SPECIAL CONCRETE

TOP OF CONC. SLAB

18" (MAX) DUMPS
STONE

CONCRETE SLAB

RELOC. NORTH NASHUA RIVER
(SEE DETAILS SEE SHEET 100)

NOT BUILT AS PROPOSED

10' (MAX) CONC.

TOP OF CONC. SLAB

LOCATION LINE

LOCATION LINE
CHANNEL

TEMPORARY EASEMENT

ABANDONED

LINE OF TEMPORARY EASEMENT

RIVER

LINE OF DRAINAGE EASEMENT

NB-104-P

NO A

PROPOSED SLOPED EDGING

ANGLE POINT

LEMINSTER CONNECTOR
NB-103-P

PROPOSED

NO ACD

LOCATION
PROPOSED CHAIN

PROPOSED CHAIN LINE POWER

42' 7" 3/4 CONC

PROPOSED SLOPED EDGING

PROPOSED SLOPED EDGING

PROPOSED SLOPED EDGING

PROPOSED SLOPED EDGING

PROPOSED SLOPED EDGING

PROPOSED SLOPED EDGING

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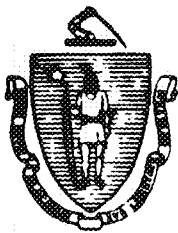
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PROPOSED SLOPED EDGING



The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Department of Public Works
Ten Park Plaza, Boston 02116-3973

March 9, 1989

Mr. F. William Swaine
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154


Dear Bill,

Please forgive the delay in getting the current traffic count for Mechanic Street in Leominster in the area of the erosion problem.

I am enclosing a page from the Leominster Searstown Signal Design that shows the count. Charles Sterling from our Traffic Section (617-973-7362) will be available to provide any additional information that you might need for your study.

Thank you for sending me the report that you have done on the erosion problem. We look forward to working with you to come up with an appropriate solution.

Sincerely,


Ellen M. DiGeronimo
Associate Commissioner

cc: Charles Sterling

TABLE 1
TRAFFIC VOLUME SUMMARY

Location	ADT* (vpd)***	AM Peak Hour (6:30-7:30 AM)			PM Peak Hour (4:15-5:15 PM)		
		Peak Hour (vph)****	"K" Factor** (%)	Directional Distribution (%)	Peak Hour (vph)	"K" Factor (%)	Directional Distribution (%)
Mechanic Street vicinity of site <i>not project location</i>	2,387	174	7.4	70 WB	225	8.5	58 EB

- * ADT = average daily traffic.
 ** "K" Factor = percent of (annual) average daily traffic.
 *** vpd = vehicles per day.
 **** vph = vehicles per hour.

*Mechanic Street
E of Commercial Drive*

*Per telecon
W/Rich Horgan*

*Tues
6-12-89*

17790

WB 7765

*Wed
6-12-89*

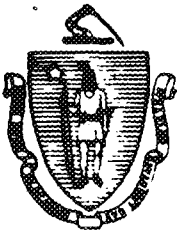
17631

WB 7605

*Thurs
6-14-89*

19583

WB 8219



The Commonwealth of Massachusetts

Executive Office of Transportation and Construction

Department of Public Works

Ten Park Plaza, Boston 02116-3973

March 21, 1989

Joseph L. Ignazio
Chief, Planning Division
Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02254-9149

SUBJECT: LEOMINSTER - Scour of Embankment along the Leominster Connector near Nashua Street.

Dear Mr. Ignazio:

At the request of the city of Leominster, the Department and the Army Corps of Engineers have investigated the erosion of the Westbound roadway embankment along the Leominster Connector near the intersection of Nashua Street.

As previously discussed with your staff, this section of the North Nashua River was to be realigned under the original Construction Contract of I-190. However, due to environmental concerns the Department was instructed to abandon this proposal. As a result the embankment now has dangerously eroded to within 15' of the Westbound roadway.

In order to progress in unison without duplicating work efforts, a joint meeting between the City, Department and Corps personnel is requested.

A meeting is scheduled for Thursday, March 30, 1989 at 10:00 A.M. at the following location:

The Commonwealth of Massachusetts
Transportation Building
Department of Public Works
10 Park Plaza
Boston, Massachusetts
6th Floor, Room 6252 - Highway Design Conference Room

(2)

LEOMINSTER - Scour of Embankment along the Leominster
Connector near Nashua Street

I sincerely hope that representatives of your department
attend this meeting to further discuss Corps input and the
Section 14 process.

Your cooperation to this matter is greatly appreciated.

Sincerely,



Robert H. Johnson, P.E.
Chief Engineer

RDH/nm

CC: Commissioner DiGeronimo
DHE District 3
Mayor, City of Leominster
S. Berlucchi, Boston Maintenance Engineer

DEPARTMENT OF PUBLIC WORKS



City of Leominster, Massachusetts 01459

108 GRAHAM STREET
AREA CODE (508) 534-7590

WAYNE M DOUCET
DIRECTOR

March 31, 1989

Mrs. Ellen DiGeronimo
Executive Office of Transportation
and Construction
Dept. of Public Works
Office of the Commissioner
Ten Park Plaza
Boston, Ma. 02116

Re: Nashua River Scour at Mechanic Street (Leominster Connector)

Dear Mrs. DiGeronimo:

Enclosed are copies of the Assessors plans and deeds for the parcels in the area of Mechanic Street and the Nashua River as you requested in our meeting at your office yesterday morning.

To summarize my understanding of the agreed plan of action resulting from yesterday's meeting, the following steps will be taken:

- 1.) M.D.P.W. District #3 will immediately have a survey party do a baseline and follow on surveys to track the horizontal and vertical removal of the slope due to scouring, erosion, and failure.
- 2.) M.D.P.W. will initiate and impliment an "Emergency"/Intermediate solution by placing a defensive line to reduce the progress of the slope deterioration. The prevailing solution during the meeting was M.D.P.W. placing Rip-Rap material with a clam-shell at the base of the slope for scour. Plus, another means of reducing the impact of a circular failure of the slope caused by too great of an angle of repose. A possible need to contract material exists and was also discussed.
- 3.) Good quality photos would be obtained by M.D.P.W. from the air, over the site. (not photogrammetric, but high quality snap shots).
- 4.) City of Leominster would provide M.D.P.W. and District #3 with Assessors plans and deeds to parcels in the area. This would enable M.D.P.W. to begin process of obtaining easements to access site. Desired approach to site is from the southwest off Mechanic Street onto City of Leominster parcel behind the Waste Water Treatment Plant.

5.) M.D.P.W. and the U.S. Army Corps of Engineers will continue on track as discussed to obtain Federal Funding for the permanent solution tentatively projected to begin construction in the spring of 1990. The suggested project costs ranged from \$270,000.00 to \$625,000.00.

6.) At no time was the City of Leominster committed to any reimbursable funding arrangements.

Thank you for your timely attention in this matter. If you have any questions, please contact me.

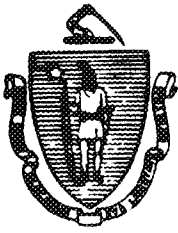
Very truly yours,



William C. Taylor
Business Manager

WCT/tmd

cc: Mayor Stephen A. Perla
John Tata - City Comptroller
Planning Board
Conservation Commission
David Larsen - CENED (USA/COE)



The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Department of Public Works
Ten Park Plaza, Boston 02116-3973

April 5, 1989

Mr. F. William Swaine
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, MA 02154

Dear Bill,

Enclosed please find the Vanasse Hangen traffic study on the Mechanic Street Intersection/Leominster Connector. I hope it will be useful to you in your evaluation of the project.

I am looking forward to working with you on this matter.

Sincerely,

Ellen M. DiGeronimo
Ellen M. DiGeronimo

September 12, 1989

Planning Division
Plan Formulation Branch

Mr. Robert H. Johnson
Chief Engineer
Massachusetts Department of Public Works
10 Park Plaza
Boston, Massachusetts 02116

Dear Mr. Johnson:

The Corps of Engineers is proposing the construction of emergency streambank protection along the North Nashua River in Leominster, Massachusetts. A meeting was held on August 28, 1989 with engineers of your staff to discuss our proposal.

We have completed the anticipated design for providing stone slope protection along approximately 400 linear feet of riverbank where severe erosion had threatened the roadway known as the Leominster Connector.

Our project would be superimposed on the existing temporary slope protection that the MDPW built in July of this year. A plan and cross section of the proposed work is enclosed. Final design will be accomplished during the preparation of plans and specifications which occurs after the project is approved by the Chief of Engineers in Washington, D.C.

At this time, we estimate that the proposed project will cost \$211,000. This includes costs for engineering, design, supervision and administration of the project construction. Current regulations require a 25 percent non-Federal cost share. Therefore, the anticipated cost sharing requirements are \$53,000 non-Federal, and \$158,000 Federal.

Prior to submission of our Definite Project Report (DPR) to the Office of the Chief of Engineers (OCE) we must obtain a letter of support from the project sponsor.

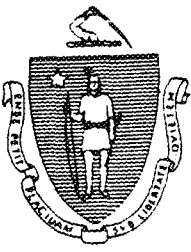
I have enclosed a copy of the draft Local Cooperation Agreement which indicates the extent of cost sharing as noted above. As soon as we receive your letter, indicating support for the proposed project and understanding of the requirements of local cost sharing, I will forward the DPR to OCE. If you have any questions on this matter, please do not hesitate to contact me at (617)647-8220, or the Project Manager, Mr. David Larsen, at (617)647-8113.

Sincerely,

Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer

Enclosures

CF:
Mr. Larsen
Planning Division Files
Reading File



The Commonwealth of Massachusetts
Executive Office of Transportation and Construction
Department of Public Works
Ten Park Plaza, Boston 02116-3973

November 22, 1989

Mr. Daniel M. Wilson
Colonel, Corps of Engineers
Division Engineer
New England Division
424 Trapelo Road
Waltham, Massachusetts 02254-9149

Dear Mr. Wilson:

Reference is made to your September 12, 1989 letter requesting a letter of support from the project sponsor for the proposed construction of approximately 400 linear feet of slope protection along the North Nashua River and Leominster Connector roadway in the City of Leominster.

Due to the temporary slope protection that the Department constructed in July of this year, and the present budget challenges ahead, we request that the Corps postpone submission of the Definite Project Report (DPR) to the Office of the Chief of Engineers (OCE) for their review and approval at this time.

The Department will monitor any on going changes that may occur during the winter months or spring flows of the river. At that time, a meeting will be held with all interested parties as to what course of action should be taken.

Therefore, we are recommending that the "anticipated design for providing stone slope for protection" done by your staff be held in abeyance.

Please express our gratitude to Mr. Bill Swaine and Mr. David Larsen for their professional commitment shown in solving this problem.

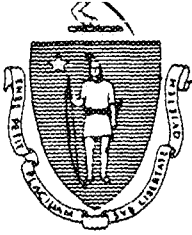
Sincerely,

Robert H. Johnson

Robert H. Johnson, P.E.
Chief Engineer

RHJ/RDH/nmm

cc: E. DiGeronimo, M. Tocci, P. McHugh, S. Berlucchi, P. Carr, J. Piaseczny, L. Bedingfield, J. Galli, Mayor, City of Leominster



The Commonwealth of Massachusetts

Executive Office of Transportation and Construction

Department of Public Works

Ten Park Plaza, Boston 02116-3973

March 26, 1990

Mr. Daniel M. Wilson
Colonel, Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02254-9149

SUBJECT: NORTH NASHUA RIVER, Emergency Streambank
Protection, Leominster, Massachusetts

Dear Colonel Wilson:

The Commonwealth of Massachusetts through the Massachusetts Department of Public Works, is hereby expressing our support for the proposed Federal Project which will provide permanent streambank protection along a portion of the westbound roadway of the Leominster Connector.

The Department has reviewed a copy of the draft Local Cooperation Agreement, prepared by your Division, and understand the terms and conditions as set forth.

The Department is of the understanding that this Agreement is not binding and the Commonwealth is not obligated to fund this project until the final plans are approved and authorization to proceed with construction is received.

We thank you for your efforts and look forward to reviewing the plans and specifications for this project.

Sincerely,

A handwritten signature in cursive script, appearing to read "G. R. Turner Jr.", followed by a flourish.

George R. Turner, Jr., P.E.
Chief Engineer

GRT/RDH/rr
cc: P. McHugh
S. Berlucchi
J. Piaseczny
L. Bedingfield